

AD-A174 006

Research Product 85-09

M60A3 Tank Procedure Guides

ARI Field Unit at Fort Knox, Kentucky  
Training Research Laboratory

February 1985

DTIC  
SELECTED  
NOV 7 1986

DTIC FILE COPY



U. S. Army Research Institute for the Behavioral and Social Sciences

Approved for public release, distribution unlimited.

86 11

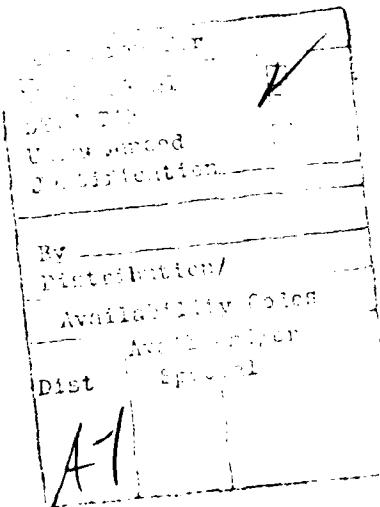
**U. S. ARMY RESEARCH INSTITUTE  
FOR THE BEHAVIORAL AND SOCIAL SCIENCES**  
**A Field Operating Agency under the Jurisdiction of the  
Deputy Chief of Staff for Personnel**

**EDGAR M. JOHNSON**  
Technical Director

**L. NEALE COSBY**  
Colonel, IN  
Commander

Technical review by

Ronald E. Kraemer  
Donald M. Kristiansen



**NOTICES**

**FINAL DISPOSITION:** This Research Product may be destroyed when it is no longer needed. Please do not return it to the U.S. Army Research Institute for the Behavioral and Social Sciences.

**NOTE:** This Research Product is not to be construed as an official Department of the Army document in its present form.



## UNCLASSIFIED

SECURITY CLASSIFICATION OF THIS PAGE (When Data Entered)

REPORT DOCUMENTATION PAGE		READ INSTRUCTIONS BEFORE COMPLETING FORM
1. REPORT NUMBER ARI Research Product 85-09	2. GOVT ACCESSION NO. <i>AD-A174 006</i>	3. RECIPIENT'S CATALOG NUMBER
4. TITLE (and Subtitle) M60A3 TANK PROCEDURE GUIDES	5. TYPE OF REPORT & PERIOD COVERED FINAL	
7. AUTHOR(s) John E. Morrison	6. PERFORMING ORG. REPORT NUMBER --	
9. PERFORMING ORGANIZATION NAME AND ADDRESS ARI Field Unit-Fort Knox Steele Hall Fort Knox, KY 40121	10. PROGRAM ELEMENT, PROJECT, TASK AREA & WORK UNIT NUMBERS 2Q263743A794	
11. CONTROLLING OFFICE NAME AND ADDRESS US Army Research Institute for the Behavioral and Social Sciences 5001 Eisenhower Avenue, Alexandria, VA 22333-5600	12. REPORT DATE February 1985	
14. MONITORING AGENCY NAME & ADDRESS (if different from Controlling Office) --	13. NUMBER OF PAGES 124	
16. DISTRIBUTION STATEMENT (of this Report)  Approved for public release; distribution unlimited.	15. SECURITY CLASS. (of this report) Unclassified	
17. DISTRIBUTION STATEMENT (of the abstract entered in Block 20, if different from Report)  --	15a. DECLASSIFICATION/DOWNGRADING SCHEDULE --	
18. SUPPLEMENTARY NOTES  Other related report is RP 85-08.		
19. KEY WORDS (Continue on reverse side if necessary and identify by block number) Retraining Army Training Job Training	Retention (Psychology) Performance (Human)	
20. ABSTRACT (Continue on reverse side if necessary and identify by block number)  This research product presents M60A3 Procedure Guides which are designed to aid experienced tank crewmen and gunners to remember and perform pre- and post-operation procedures for the M60A3 battle tank. One of the notable innovations of the Procedures is the abbreviated algorithmic format for presenting task information. Also, separate booklets were developed for tank commander and gunner tasks. And both booklets were designed to be reduced and inserted into plastic binders. These innovations were intended to make the Procedure Guides easy to use and rugged enough to withstand the rigors of the tank environment.		

**Research Product 85-09**

## **M60A3 Tank Procedure Guides**

**John E. Morrison**

**ARI Field Unit at Fort Knox, Kentucky**  
**Donald F. Haggard, Chief**

**Training Research Laboratory**  
**Harold F. O'Neil, Jr., Director**

**U.S. ARMY RESEARCH INSTITUTE FOR THE BEHAVIORAL AND SOCIAL SCIENCES**  
**5001 Eisenhower Avenue, Alexandria, Virginia 22333-5600**

**Office, Deputy Chief of Staff for Personnel**  
**Department of the Army**

**February 1985**

---

**Army Project Number**  
**2Q263743A794**

**Education and Training**

**Approved for public release; distribution unlimited.**

ARI Research Reports and Technical Reports are intended for sponsors of R&D tasks and for other research and military agencies. Any findings ready for implementation at the time of publication are presented in the last part of the Brief. Upon completion of a major phase of the task, formal recommendations for official action normally are conveyed to appropriate military agencies by briefing or Disposition Form.

---

FOREWORD

The Army Research Institute (ARI) Field Unit at Fort Knox, Kentucky, is engaged in research and development on armor training and performance problems related to armor weapon systems. One such problem is that the armor crewman must perform a number of lengthy and complex procedures to prepare the M60A3 battle tank for operation and to power the tank down after operation. Although the M60A3 Operator's Manual (TM 9-2350-253-10) provides complete documentation on these procedural tasks, the TM is a less than ideal job performance aid for the armor crewman who is familiar with the tasks. The Procedure Guides presented herein provide appropriate and convenient aids to help experienced armor crewmen remember and perform procedures for the M60A3 tank.

The M60A3 Procedure Guides were developed along the lines of the M1 Procedure Guides which incorporate a number of innovations. One of the more notable innovations is the abbreviated task information presented in an algorithmic format. Also, the booklets are specific to either tank commander or gunner tasks. And both booklets can be reduced and inserted into plastic ring binders. These innovations were designed to make the Procedure Guides easy to use and rugged enough to withstand the rigors of the tank environment.

The armor community has demonstrated considerable interest in the Procedure Guides. Both the M1 and M60A3 Procedure Guides have been adopted by the Armor School for distribution to armor units worldwide. Furthermore, the development methodology and format of these armor documents were used by the Fort Benning Field Unit to produce Procedure Guides for the Infantry Fighting Vehicle.



EDGAR M. JOHNSON  
Technical Director

## M60A3 TANK PROCEDURE GUIDES

### CONTENTS

	<u>Page</u>
<b>OVERVIEW . . . . .</b>	1
<b>Background . . . . .</b>	1
<b>Development . . . . .</b>	1
<b>Features . . . . .</b>	1
<b>How to Use . . . . .</b>	2
<b>APPENDIX A. TANK COMMANDER PROCEDURE GUIDES . . . . .</b>	<b>A-1</b>
<b>B. GUNNER PROCEDURE GUIDES . . . . .</b>	<b>B-1</b>

## OVERVIEW

### Background

To prepare the M60A3 battle tank for operation and to power down after operation, armor crewmen have to perform a number of procedural tasks. Although the M60A3 Operator's Manual (TM 9-2350-253-10) presents complete documentation on these tasks, it provides a less than ideal job performance aid for experienced armor crewmen. Some of the problems with the TM include:

- Excessive detail: The procedures are described at an inappropriate level of detail for the experienced performer.
- Large size: The TM is large and cumbersome to use.
- One per tank: Because only one TM is issued per tank, it is unavailable to three of the four crewmen during pre- and post-operations checks.

The M60A3 Procedure Guides were designed to address these problems by providing position-specific job aids that are convenient and complete.

### Development

Eighteen tank commander and 15 gunner procedures were chosen to be included in the Procedure Guides. The format for the M60A3 Guides was taken from Procedure Guides previously developed for the M1 tank.<sup>1,2</sup> All task information was derived from the TM in order to make the Guides compatible with the TM.

### Features

Some of the more notable features of the M60A3 Procedure Guides are listed below:

- "Part . . . action" format: Task information is abridged by casting each step in this format.
- Algorithmic conventions: Flowchart symbols are used to describe branch points in more complex tasks.
- Notes/cautions/warnings: These items which concern task performance, safety, or system integrity are identified at appropriate points in the procedure.

---

<sup>1</sup>Silbernagel, B. L., Vaughan, J. J., Jr., and Schaefer, R. H. Development of M1 Abrams Tank Sustainment Training Material. ARI Research Report 1334, June 1982.

<sup>2</sup>Vaughan, J. J., Silbernagel, B., and Goldberg, S. L. M1-Abrams Tank Procedure Guides. ARI Research Product 82-09, July 1982.

- Identification of common subprocedures: To avoid duplication of information, common subprocedures are identified and presented as separate procedures.
- Convenient, rugged packaging: The guides are designed to be reduced to a smaller (4½" x 7") format and inserted in plastic covered ring binders.
- Separate booklets: Separate Procedure Guides are provided for tank commander and gunner tasks.
- Preventive Maintenance Checks and Services (PMCS): PMCS tasks are presented in the appropriate books, and the tank commander book also has a master checklist.

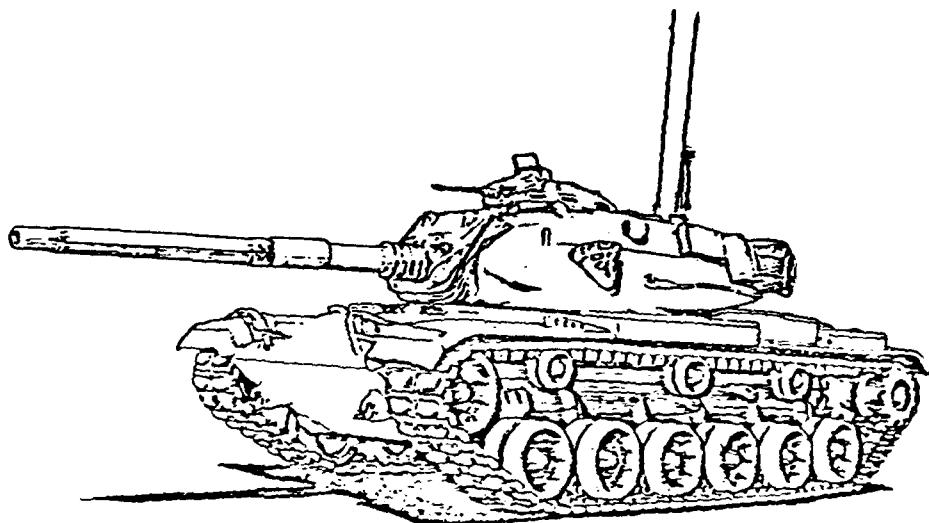
#### How To Use

The Procedure Guides are designed to complement the TM, not to replace it. The TM is still the most appropriate reference for the details of equipment operation. And the TM should be used for initial training of procedures. The Procedure Guides should be introduced only after soldiers are reasonably familiar with the equipment and task terminology. Additional training on the Procedure Guides themselves is also required to acquaint soldiers with its algorithmic style and abbreviations.

**TANK COMMANDER**

PROCEDURE GUIDES

M60A3 TANK



July 1982

PREPARED BY THE U.S. ARMY RESEARCH INSTITUTE  
FOR THE  
BEHAVIORAL AND SOCIAL SCIENCES

## GENERAL INFORMATION

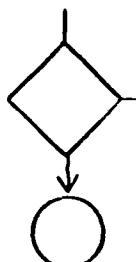
This booklet contains M60A3 tank commander procedures guides. Each guide is for a single pre-operation, post-operation, or during operation activity. Each guide is matched to TM 9-2350-253-10 (Operator's Manual for Tank, Combat, Full-Tracked: 105-MM Gun, M60A3).

## PURPOSE OF PROCEDURE GUIDES

The guides in this booklet will not take the place of the M60A3 Operator's Manual or M60A3 training materials. The guides will aid you in remembering long or difficult sets of procedures. In short, the guides will help to "jog your memory."

## USE OF THIS BOOKLET

The Table of Contents (on the next page) lists the procedure guides in this booklet. Each guide gives you a step-by-step outline for completing an activity. The following instructions will help you to better use each guide.



1. Some steps within a procedure are followed by a page number. On that page you will find a detailed breakdown of the step.
2. Some of the procedure guides include a question(s). Each question is stated inside a diamond shape. Your "yes" or "no" to the question will show you which path to follow.
3. Some paths lead to an instruction to go to a particular step number within a procedure. The step number is given within a circle.
4. Some steps within a procedure guide are followed by a box. In the box you will find more information on the step or a caution/warning.
5. Certain steps within a procedure guide require that a knob or switch be turned to a certain position. In some cases, that position might be written like the symbol to the left. The symbol means that a light should also come on.
6. Master check-off lists of all before, during, and after operations preventative maintenance checks and services (PMCS) performed by crewmembers are included as an aid in your supervision of these activities.
7. At the beginning of each procedure, the TM page number reference for the procedure is given under the task name. These references will help you if you need more information to complete the task.

## TABLE OF CONTENTS

	<u>Page</u>
<b><u>COMMANDER'S PERISCOPE M36E1</u></b>	
INSTALLING COMMANDER'S PERISCOPE M36E1 . . . . .	1
OPERATING COMMANDER'S PERISCOPE M36E1 . . . . .	2
REMOVING COMMANDER'S PERISCOPE M36E1 . . . . .	4
<b><u>LASER RANGEFINDER (LRF)</u></b>	
OPERATING LASER RANGEFINDER (LRF) . . . . .	6
LASER RANGEFINDER SELF-TEST . . . . .	8
RANGING AND LOGIC TABLE . . . . .	14
LRF FIRING TEST . . . . .	15
BORESIGHTING LASER RANGEFINDER (LRF) . . . . .	16
<b><u>COMMANDER'S MACHINE GUN</u></b>	
CLEARING CALIBER .50 MACHINE GUN . . . . .	19
INSTALLING CALIBER .50 MACHINE GUN . . . . .	21
TESTING CALIBER .50 MACHINE GUN FIRING CIRCUIT . . . . .	23
BORESIGHTING CALIBER .50 MACHINE GUN . . . . .	25
ZEROING CALIBER .50 MACHINE GUN . . . . .	29
REMOVING CALIBER .50 MACHINE GUN . . . . .	32
PREPARING TO FIRE PROCEDURE . . . . .	33
<b><u>PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)</u></b>	
DURING OPERATIONS PMCS . . . . .	38
MASTER CHECK-OFF LIST -- BEFORE OPERATIONS PMCS . . . . .	40
MASTER CHECK-OFF LIST -- DURING OPERATIONS PMCS . . . . .	42
MASTER CHECK-OFF LIST -- AFTER OPERATIONS PMCS . . . . .	43
<b><u>PICTURES</u></b>	
LASER RANGEFINDER RECEIVER-TRANSMITTER . . . . .	45
NETWORKS BOX . . . . .	46
AMMUNITION SELECT UNIT . . . . .	47

INSTALLING COMMANDER'S PERISCOPE M36E1

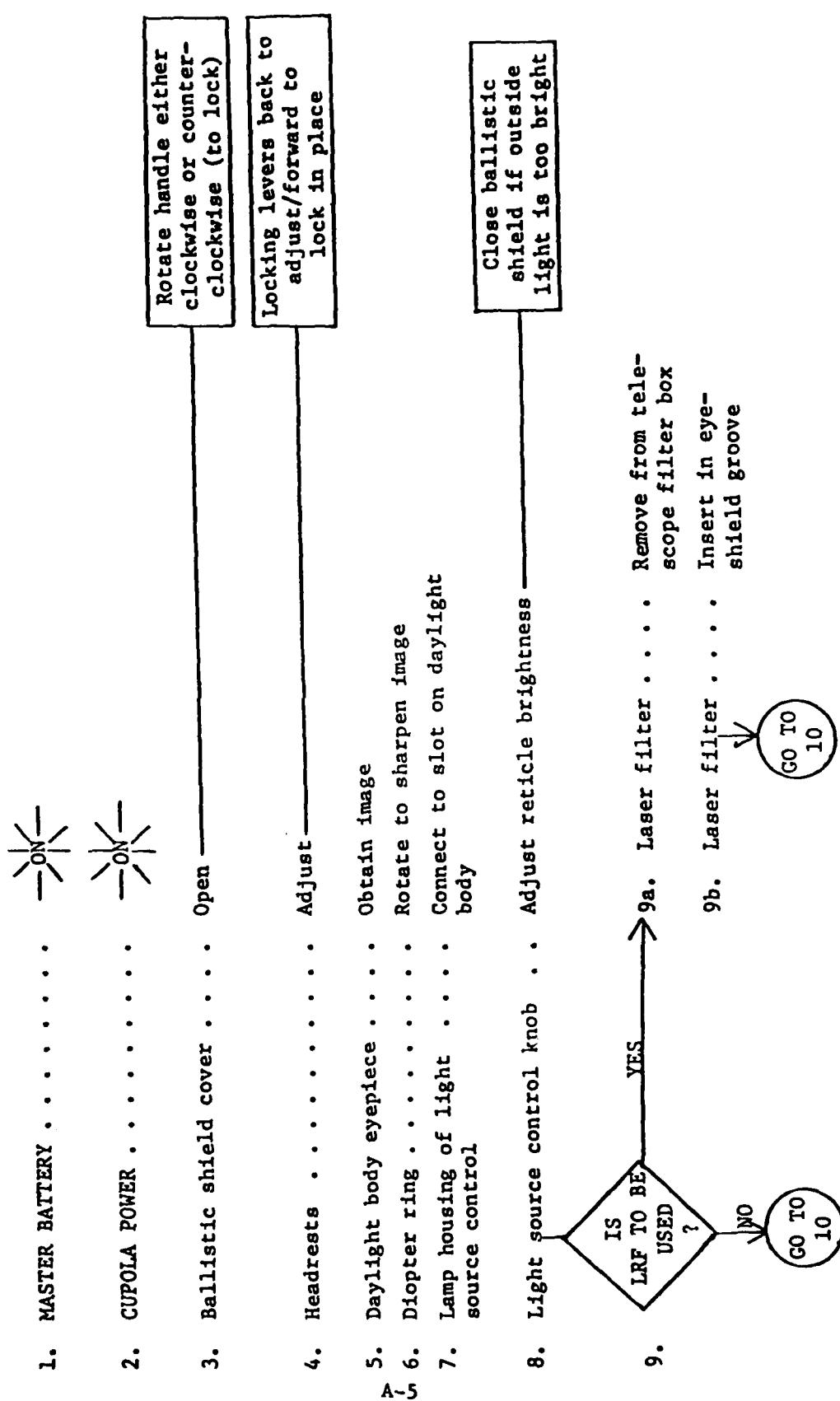
(TM page 3-122)

LINK ASSEMBLY MUST BE DISCONNECTED FROM  
PERISCOPE AND ATTACHED TO STOWAGE HANGER  
BEFORE INSTALLING PERISCOPE DAYLIGHT BODY

1. Daylight body . . . . . Slide into position carefully
2. Daylight body latches . . . . Engage Support daylight body with one hand
3. Passive elbow . . . . . Slide into position carefully
4. Passive elbow latches . . . . Engage Support passive elbow with one hand
- A-5. Two electrical connectors . . . Connect to rear of daylight body
6. Quick-disconnect clamp . . . Disconnect from stowage hanger/  
connect to periscope elevation arm
7. Stowage hanger . . . . . Place in cupola ceiling stowage clip

OPERATING COMMANDER'S PERISCOPE M36E1

(TM page 2-234)



**OPERATE PASSIVE ELBOW ONLY UNDER  
LOW LIGHT CONDITIONS OR WITH  
BALLISTIC SHIELD COVER CLOSED**

**Open shutter and  
activates power  
switch**

**Use lowest possible  
intensity**

- 10.. Passive elbow shutter lever . Move to the left
11. RETICLE control . . . . . Adjust reticle brightness
12. TUBE control . . . . . Adjust tube brightness
13. Diopter ring . . . . . Focus background
14. Focus ring . . . . . Focus target image
15. Tube control . . . . . Readjust for clearest image

REMOVING COMMANDER'S PERISCOPE M36E1

(TM page 3-122)

1. Cal .50 machine gun . . . . . Elevate to upper limit
2. Quick-disconnect clamp . . . . . Disconnect from periscope elevation arm
3. Elevation arm . . . . . Move toward rear of cupola
4. Quick-disconnect clamp . . . . . Connect to stowage hanger

LINK ASSEMBLY MUST BE DISCONNECTED FROM PERISCOPE  
AND ATTACHED TO STOWAGE HANGER BEFORE REMOVING  
M36 PERISCOPE DAYLIGHT BODY.

5. Two electrical connectors . . . . . Disconnect from rear of daylight body
6. Lamp housing . . . . . . . . . Disconnect from daylight body (dovetail slot)
7. Lamp housing . . . . . . . . . Connect to light source control (dovetail slot)
8. M30 instrument light . . . . . Disconnect from passive elbow

A-7

Support passive  
elbow with  
one hand

GO TO  
10

GO TO  
10

Release

Passive  
elbow latches

10. Passive elbow . . . . . Lower carefully
11. Daylight body latches . . . Release \_\_\_\_\_
12. Daylight body . . . . . Lower carefully

Support day-light body with one hand



OPERATING LASER RANGEFINDER (LRF)

(TM page 2-246)

A-9

6

LIMIT SUSTAINED RANGING RATE TO THREE PER MINUTE OR SIX PER TWO MINUTES WITH THREE-MINUTE INTERVALS BETWEEN EACH TWO MINUTE RANGING PERIOD.

DO NOT LEAN AGAINST RECEIVER-TRANSMITTER WHEN VIEWING THROUGH EYEPIECE OR LASING.

MAKE SURE BLISTER COVER IS LOCKED IN THE OPEN POSITION WHEN RANGING.

1. MODE . . . . . TEST —————— ON (driver)
2. MASTER BATTERY . . . . . ON (gunner)
3. POWER . . . . . Adjust ——————
4. Headrest . . . . . Use serrated knob to release and lock

GO TO  
5

- 5. Blister cover . . . . . Lock in open position
- 6. Eyepiece . . . . . Sight image
- 7. Diopter ring . . . . . Adjust until image is sharp and clear
- 8. RETICLE BRIGHTNESS . . . . . Adjust reticle brightness
- 9. 6X/12X switch . . . . . Select appropriate power
- 10. Rubber eye shield . . . . . Pull off
- 11. Laser filter . . . . . Remove from stowage bracket/  
snap over eyepiece
- 12. Rubber eye shield . . . . . Replace

LASER RANGEFINDER SELF-TEST

(TM page 2-248)

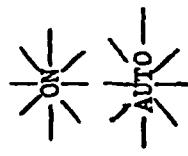
1. MODE . . . . . — TEST —
2. MASTER BATTERY . . . . . — ON —
3. POWER . . . . . — ON — (gunner)
4. MANUAL/RANGEFINDER . . . . . RANGEFINDER (gunner)
5. LIGHT/DIM/TEST . . . . . — TEST —
6. Control panel indicators . . . . All should illuminate
7. RANGE (METERS) . . . . . Should display 8888
8. RETURNS . . . . . Should display 8
9. LIGHT/DIM/TEST . . . . . — LIGHT — or — DTM —
10. Control panel indicators . . . . The following should illuminate:  
FEED, BATL RNG, LAST, TEST

GO TO  
11

A-11

11. RANGE (METERS) . . . . . Should display 0000  
12. RETURNS . . . . . Should display 0

DO NOT PRESS RANGE SWITCH OR THUMB  
SWITCHES ON GUNNER'S CONTROL HANDLES  
WHILE MODE SWITCH IS IN ON OR AUTO.  
LASER WILL FIRE.



13. MODE . . . . .  
14. MODE . . . . .  
15. RANGE indicator . . . . . Should flash within  
4 seconds  
A-16. MANUAL/RANGEFINDER . . . . . MANUAL (gunner)  
17. RANGE indicator . . . . . Should not flash  
18. MANUAL/RANGEFINDER . . . . . RANGEFINDER (gunner)  
19. MODE . . . . .  
20. EMER POWER . . . . . ON (gunner)  
21. Indicators on electronics . . . Should remain on  
unit

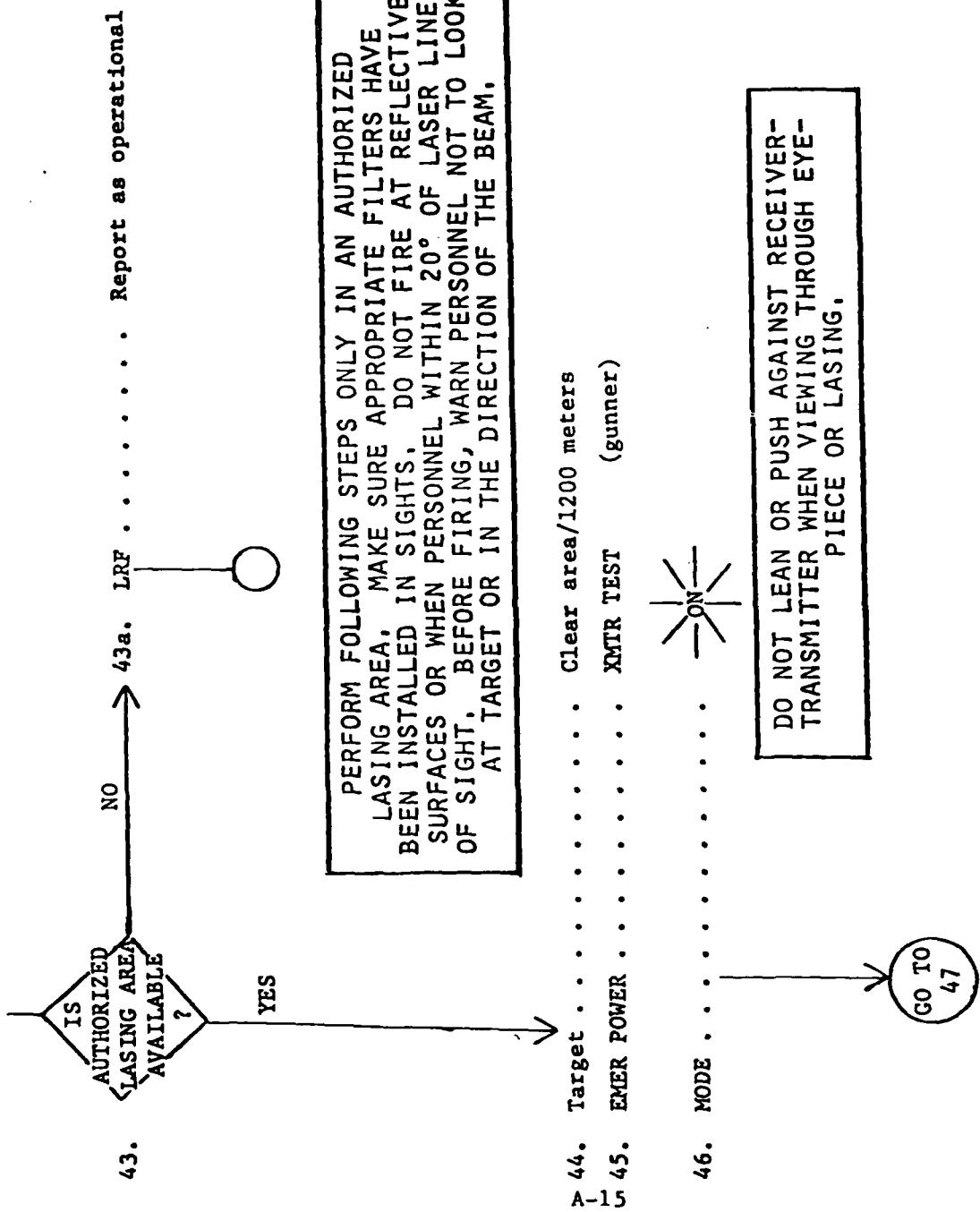


GO TO  
22

- 10
22. EMER POWER . . . . . XMTR TEST (gunner)
  23. Indicators on electronics . . . Should remain on unit
  24. EMER POWER . . . . . OFF (gunner)
  25. RANGE pushbutton . . . . . —————Depress/Hold————
  26. RANGE (METERS) . . . . . Should display 0002
  27. Malf . . . . . Should illuminate
  28. RANGE . . . . . Release
  29. BATL RNG . . . . . Depress
  30. LRF panel . . . . . Perform logic test
- Indicator should  
illuminate  
  
 Use Ranging and  
Logic Table (page 14)
- DO NOT LOOK INTO LRF EYEPIECE  
WHEN FIRING LASER INTO THE BLISTER DOOR.
31. Blister door . . . . . Assure closed
  32. Blister door pin . . . . . Assure installed
  33. EMER POWER . . . . . XMTR TEST (gunner)
  34. MODE . . . . . →ON←
- GO TO  
35

35. RANGE indicator ..... Should flash within  
4 seconds
36. RANGE pushbutton ..... — Press/Release —
37. Selector lights ..... LAST should illuminate
38. RETURNS ..... Should display 0
39. RANGE (METERS) ..... Should display 9995 ( $\pm 15$ )
40. SEL light ..... Should be on
41. GO light ..... Should be off
- A-42. IS SELF-TEST COMPLETED SUCCESSFULLY ?
- NO ——————> 42a. LRF ..... Report as non-operational
- YES ——————> GO TO 43
- 
- ```

graph TD
    A{IS SELF-TEST COMPLETED SUCCESSFULLY ?} -- NO --> B[42a. LRF]
    B --> C(( ))
    C -- "Report as non-operational" --> D(( ))
    C --> E((GO TO 43))
    A -- YES --> E
  
```



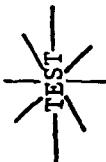
Use LRF Firing  
Test Table (page 15)

47. LRF reticle . . . . . Lay on target

48. LRF panel . . . . . Perform firing test

IF TARGET RANGE IS NOT OBTAINED DURING  
LRF TEST, MAKE SURE THAT LRF AND GUNNER'S  
RETICLES ARE ON THE SAME POINT. IF NOT  
REBORESIGHT THE SYSTEM AT EARLIEST  
OPPORTUNITY.

49. ENTER POWER . . . . . OFF-



50. MODE . . . . .

Ranging and Logic Table

| Step | Set MODE switch to TEST | Inputs            |                 | Indications     |                           |           |          |
|------|-------------------------|-------------------|-----------------|-----------------|---------------------------|-----------|----------|
|      |                         | Press and Release | Selector Lights | RETURNS Display | (METERS) Display (+ .15)* | SEL Light | GO Light |
| 1    | RESET                   | LAST              | 0               | 0000            | OFF                       | OFF       | OFF      |
| 2    | RANGE                   | LAST              | 1               | 850             | OFF                       | ON        | ON       |
| 3    | BATT, RNG               | LAST              | 0               | 0000            | OFF                       | OFF       | OFF      |
| 4    | RANGE                   | LAST              | 1               | 850             | OFF                       | ON        | ON       |
| 5    | 1                       | LAST              | 1               | 850             | OFF                       | ON        | ON       |
| 6    | 2                       | LAST              | 1               | 850             | OFF                       | ON        | ON       |
| 7    | RANGE                   | LAST              | 2               | 1850            | OFF                       | ON        | ON       |
| 8    | RANGE                   | LAST              | 3               | 2850            | OFF                       | ON        | ON       |
| 9    | RANGE                   | LAST              | 4               | 2850            | ON                        | OFF       | ON       |
| 10   | 1                       | 1                 | 4               | 850             | ON                        | OFF       | ON       |
| 11   | 2                       | 2                 | 4               | 1850            | ON                        | OFF       | ON       |
| 12   | LAST                    | LAST              | 4               | 2850            | ON                        | OFF       | ON       |
| 13   | 2                       | 2                 | 4               | 1850            | ON                        | OFF       | ON       |
| 14   | FEED                    | 2                 | 4               | 1850            | OFF                       | ON        | ON       |
| 15   | RESET                   | LAST              | 0               | 0000            | OFF                       | OFF       | OFF      |
| 16   | 2                       | 2                 | 0               | 0000            | OFF                       | OFF       | OFF      |
| 17   | RANGE                   | 2                 | 1               | 9995**          | ON                        | OFF       | OFF      |
| 18   | FEED                    | 2                 | 1               | 9995            | ON                        | OFF       | OFF      |
| 19   | RANGE                   | 2                 | 2               | 1850            | ON                        | OFF       | ON       |
| 20   | FEED                    | 2                 | 2               | 1850            | OFF                       | ON        | OFF      |
| 21   | Range**                 | LAST              | 0               | 0000            | OFF                       | OFF       | OFF      |
| 22   | RESET                   | LAST              | 0               | 0000            | OFF                       | OFF       | OFF      |

\*Last digit of range display must always be 0 or 5.

\*\*If RANGE (METERS) displays 0000, go back to step 15.

\*\*\*Set ELEV/TRAV POWER switch to ON position and range from gunner's handles.  
Set ELEV/TRAV POWER switch to OFF position.

LRF Firing Test

15

|      | Inputs            |                 | Indications     |                            |           |          |
|------|-------------------|-----------------|-----------------|----------------------------|-----------|----------|
| Step | Press and Release | Selector Lights | Returns Display | RANGE (METERS)<br>(± 15)** | SEL Light | GO Light |
| 1    | RESET             | LAST            | 0               | 0000                       | OFF       | OFF      |
| 2    | 2                 | 2               | 0               | 0000                       | OFF       | OFF      |
| 3    | RANGE             | 2               | 1               | 9995*                      | ON        | OFF      |
| 4    | 1                 | 1               | 1               | Target Range****           | ON        | OFF      |
| 5    | FEED              | 1               | 1               | Target Range               | OFF       | ON       |
| 6    | Range**           | LAST            | 1               | Target Range               | ON        | OFF      |

\*If RANGE (METERS) displays 0000, press RESET and repeat test sequence.

\*\*Last digit of range display must always be 0 or 5.

\*\*\*Set ELEV/TRAV POWER switch to ON position and range from gunner's station.  
Set ELEV/TRAV POWER switch to OFF position.

\*\*\*\*If RANGE (METERS) displays 9995, set EMER POWER to OFF and repeat steps 1-4.

BORESIGHTING LASER RANGEFINDER (LRF)

(TM page 2-350)

DO NOT VIEW LASER BEAM THROUGH DEVICE  
NOT FILTERED FOR LASER LIGHT.  
FIRE  
LASER IN AUTHORIZED LASING AREA ONLY.

1. Laser filter . . . . . Install on eyepiece
2. RETICLE BRIGHTNESS . . . . . Rotate until reticle is just visible
3. MANUAL/RANGEFINDER . . . . . RANGEFINDER
4. MODE . . . . . ON
5. BATT RNG . . . . . Press

A-19

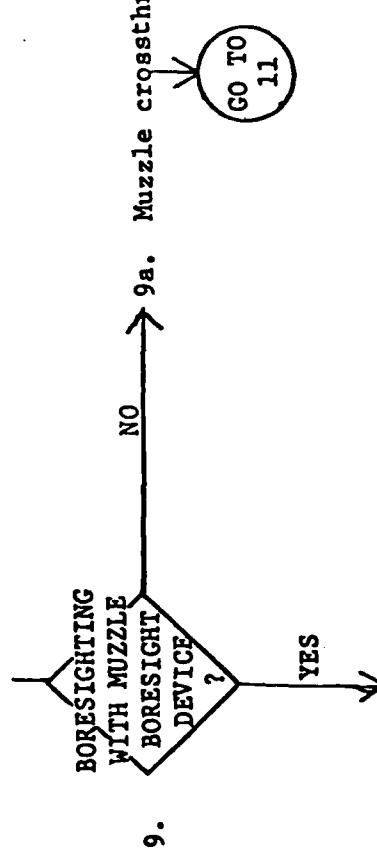
DO NOT LEAN OR PUSH AGAINST RECEIVER-TRANSMITTER  
WHEN VIEWING THROUGH EYEPIECE OR LASING.

6. 6X/12X . . . . . 12X
7. Eyepiece . . . . . Sight target

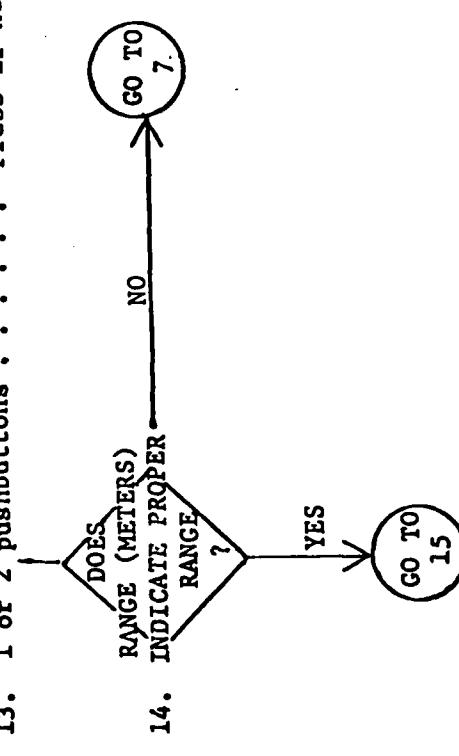
GO TO  
8

8. DEFLECTION AND ELEVATION controls  
..... Lay reticle on aiming point

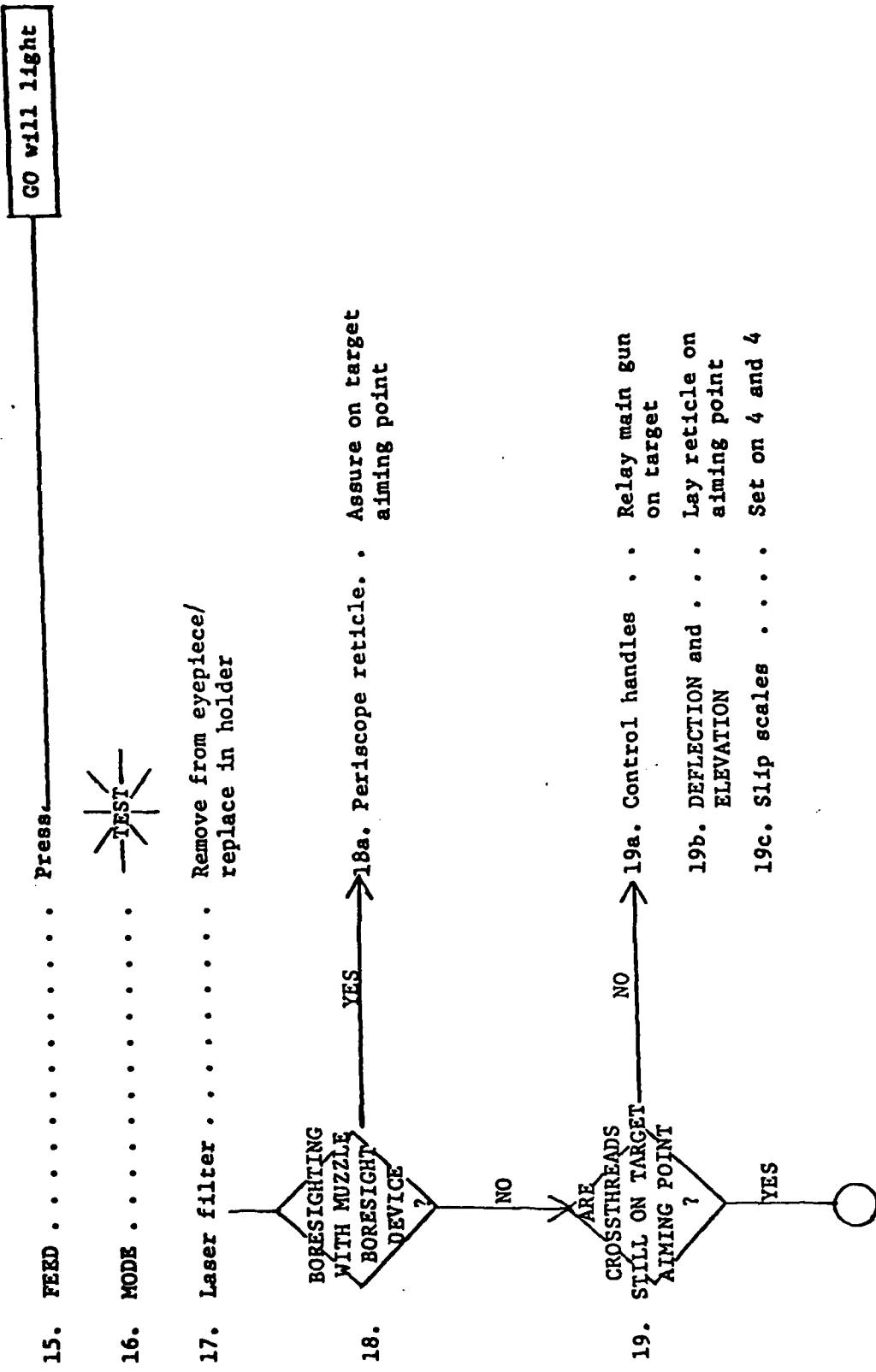
Lay reticle from  
left to right and  
from low to high  
without overtravel



- 9a. Muzzle crossthreads • Assure on target aiming point  
.....  
GO TO 11
10. Periscope reticle • • • • •  
11. Slip scales • • • • •  
12. RANGE • • • • •  
13. 1 or 2 pushbuttons • • • • •  
.....  
Assure on target  
aiming point  
Set on 4 and 4  
Press  
Press if necessary

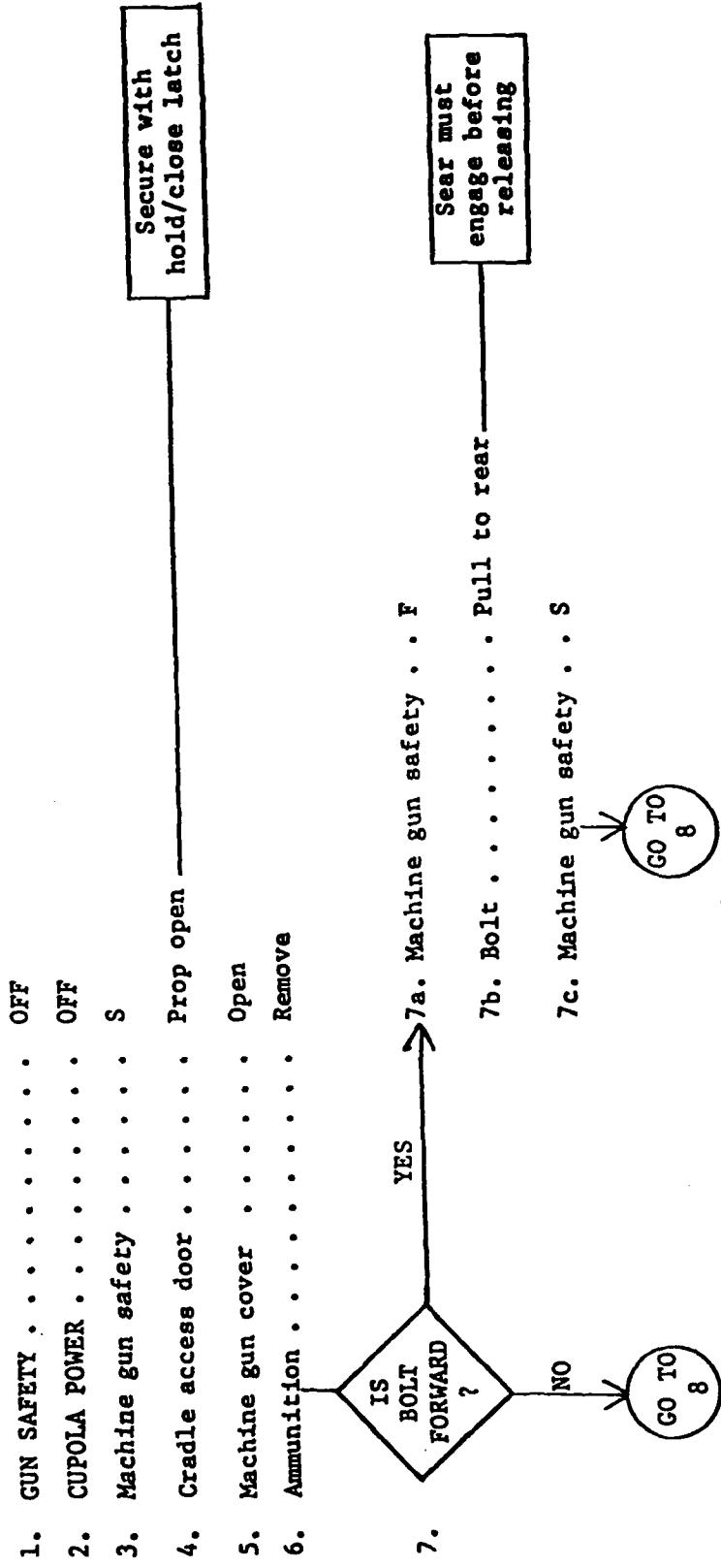


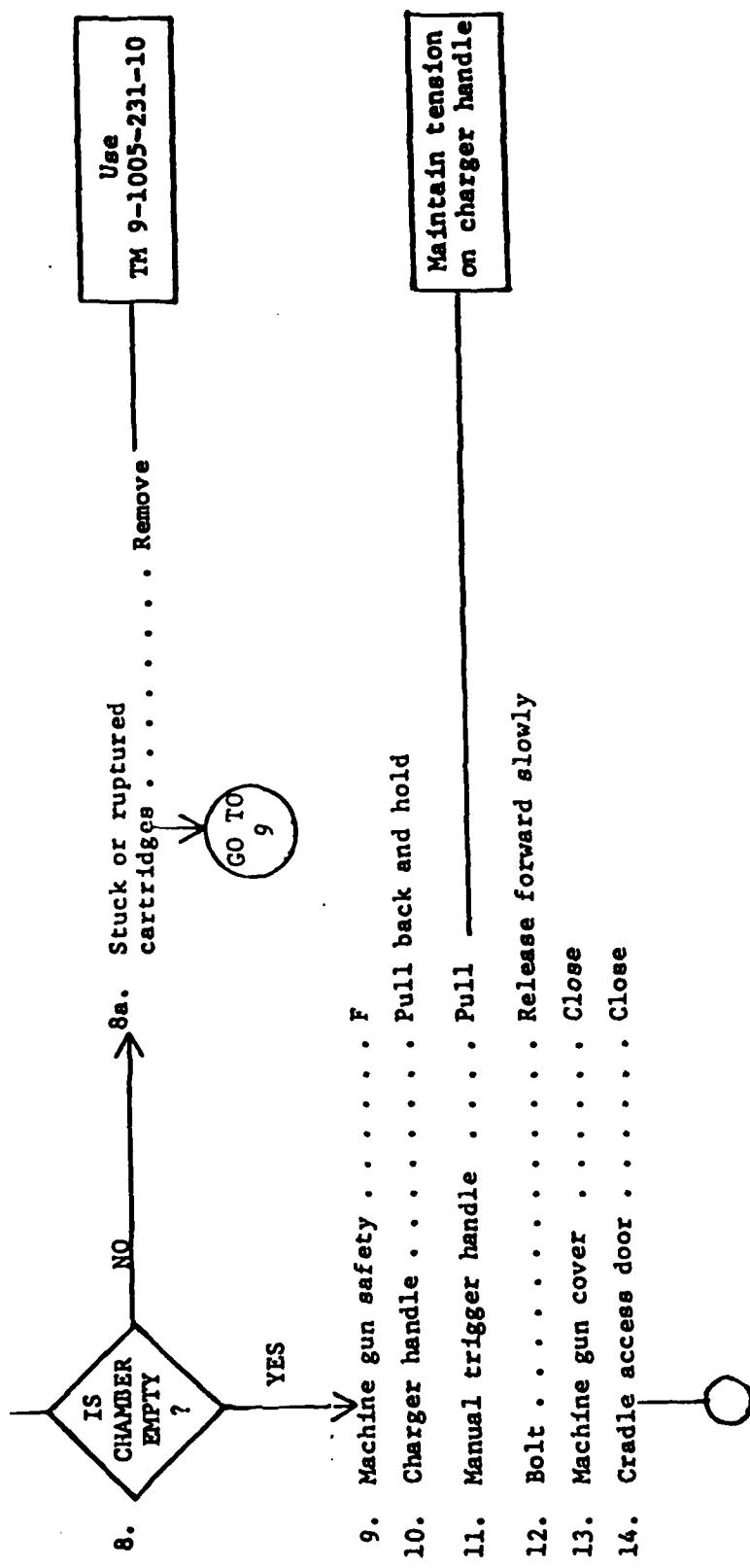
A-20



CLEARING CALIBER .50 MACHINE GUN

(TM page 2-337)





INSTALLING CALIBER .50 MACHINE GUN

(TM page 3-122)

LINK ASSEMBLY MUST BE CONNECTED TO STOWAGE  
HANGER BEFORE INSTALLING CAL .50 MACHINE GUN.

1. Machine gun . . . . . Clear (page 19)
  2. Rear mounting pin . . . . . Remove
  3. Machine gun cradle . . . . . Elevate \_\_\_\_\_  

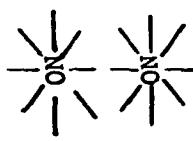
So that gun can slide  
under TC's periscope
  4. Machine gun . . . . . Slide in cradle
  5. Rear mounting pin . . . . . Secure gun in cradle
  6. Solenoid lead connector . . . Connect to end plate
- A-24
7. IS FIXED  
FEED CHUTE  
ALINED WITH  
FEEDWAY ?
- NO → 7a. Organizational . . . Notify  
maintenance
- YES → 8. Cradle access door . . . . . Open
- GO TO 9

9. Barrel . . . . . Insert/rotate 1/4 turn
10. Cradle access door . . . . . Close
11. Quick-disconnect clamp . . . . . Disconnect from stowage/hanger/connect to periscope elevation arm
12. Stowage hanger . . . . . Place in cupola ceiling  
stowage clip
13. Cal .50 firing circuit . . . . . Test (page 23)

TESTING CALIBER .50 MACHINE GUN FIRING CIRCUIT

(TM page 3-121)

1. Machine gun • • • • • Clear (page 19)



2. MASTER BATTERY • • • • •

3. CUPOLA POWER • • • • •

4. GUN SAFETY • • • • • ON

5. Dummy ammo • • • • • Load

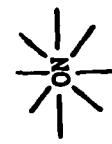
or

Last round sensing switch • • Depress

6. LAST ROUND OVERRIDE • • • OFF

IS  
GUN  
READY  
LIGHT  
ON  
?

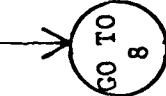
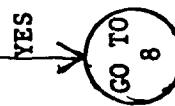
7.

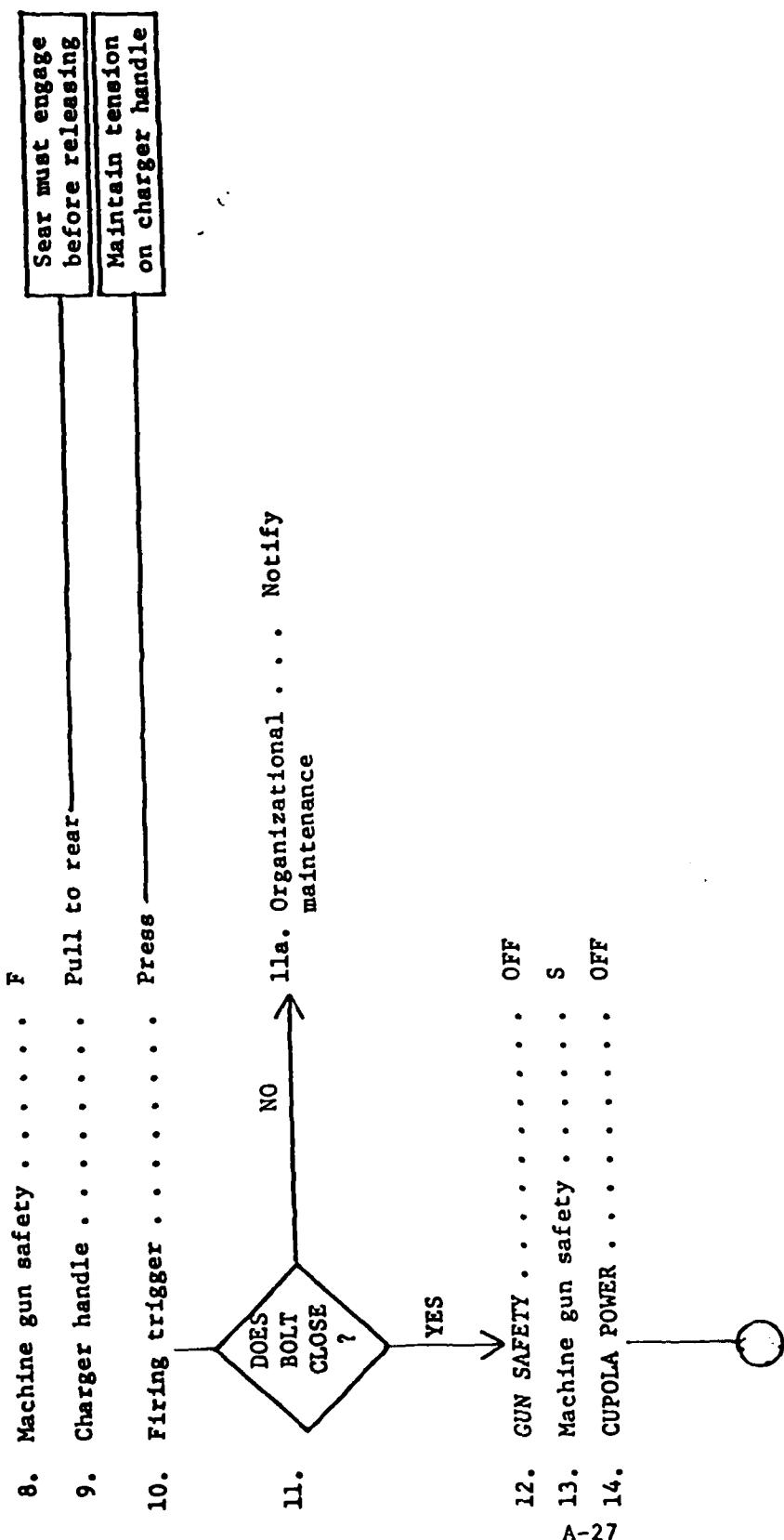


• • • • •

NO

7a. LAST ROUND OVERRIDE • • • • •

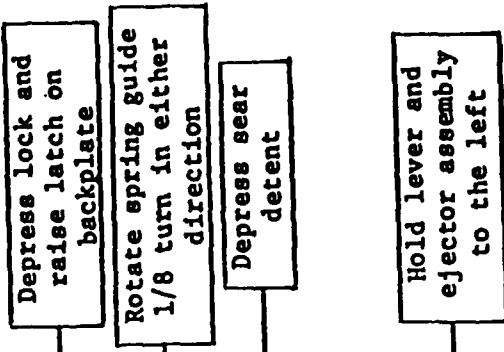




BORESIGHTING CALIBER .50 MACHINE GUN

(TM page 2-366)

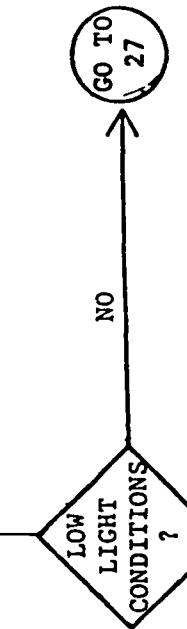
1. Tank position . . . . . Level
2. Machine gun . . . . . Elevate to upper limit
3. M36E1 Periscope . . . . . Remove (page 4)
4. Machine gun . . . . . Clear (page 19)
5. Solenoid lead connector . . . Disconnect from backplate assembly
6. Backplate . . . . . Lift off \_\_\_\_\_
7. Bolt buffer group . . . . . Remove \_\_\_\_\_
8. Sear assembly . . . . . Remove \_\_\_\_\_
9. Charger handle . . . . . Pull slowly
10. Cover . . . . . Open
11. Bolt assembly . . . . . Pull out \_\_\_\_\_
12. Cover . . . . . Close
13. Boresight target . . . . . Right angle/500 meters



GO TO  
14

**Use manual  
controls**

14. Center of barrel . . . . . Aline on target  
aiming point
15. AZIMUTH LOCK . . . . . Push up
16. Azimuth adjustment knob . . . . . Adjust azimuth precisely  
if necessary
17. Machine gun/cupola . . . . . Do not move
18. M36E1 Periscope . . . . . Install (page 1)
19. M36E1 Periscope . . . . . Prepare for operation (page 2)
20. Daylight body eyepiece . . . . . Sight target/disengage
21. Daylight body elevation . . . . . Aline boresight cross on  
target aiming point
22. Slip scales of daylight body . Set on 4 and 4



A-29

24. Searchlight . . . . . Light target momentarily  
if necessary
25. Passive body eyepiece . . . . . Sight target/disengage

26. Passive body elevation . . . Aline reticle on aiming point and deflection knobs
27. Slip scales of passive elbow . . . Set on 4 and 4
28. Daylight body reticle . . . Verify still on target aiming point

**LINK ASSEMBLY MUST BE DISCONNECTED FROM PERISCOPE AND ATTACHED TO STOWAGE HANGER BEFORE ASSEMBLING CAL .50 MACHINE GUN.**

29. Cal .50 machine gun . . . . . Elevate to upper limit
30. Quick-disconnect clamp . . . . . Disconnect from periscope elevation arm
31. Elevation arm . . . . . Move toward rear of cupola
32. Quick-disconnect clamp . . . . . Connect to stowage hanger
33. M36E1 Periscope . . . . . Remove (page 4)
34. Cover . . . . . Open
35. Bolt locks . . . . . Depress
36. Bolt assembly . . . . . Slide into barrel extension assembly
37. Hand . . . . . Remove from lever assembly
38. Bolt assembly . . . . . Slide forward

Hold lever and  
ejector assemblies  
to the left

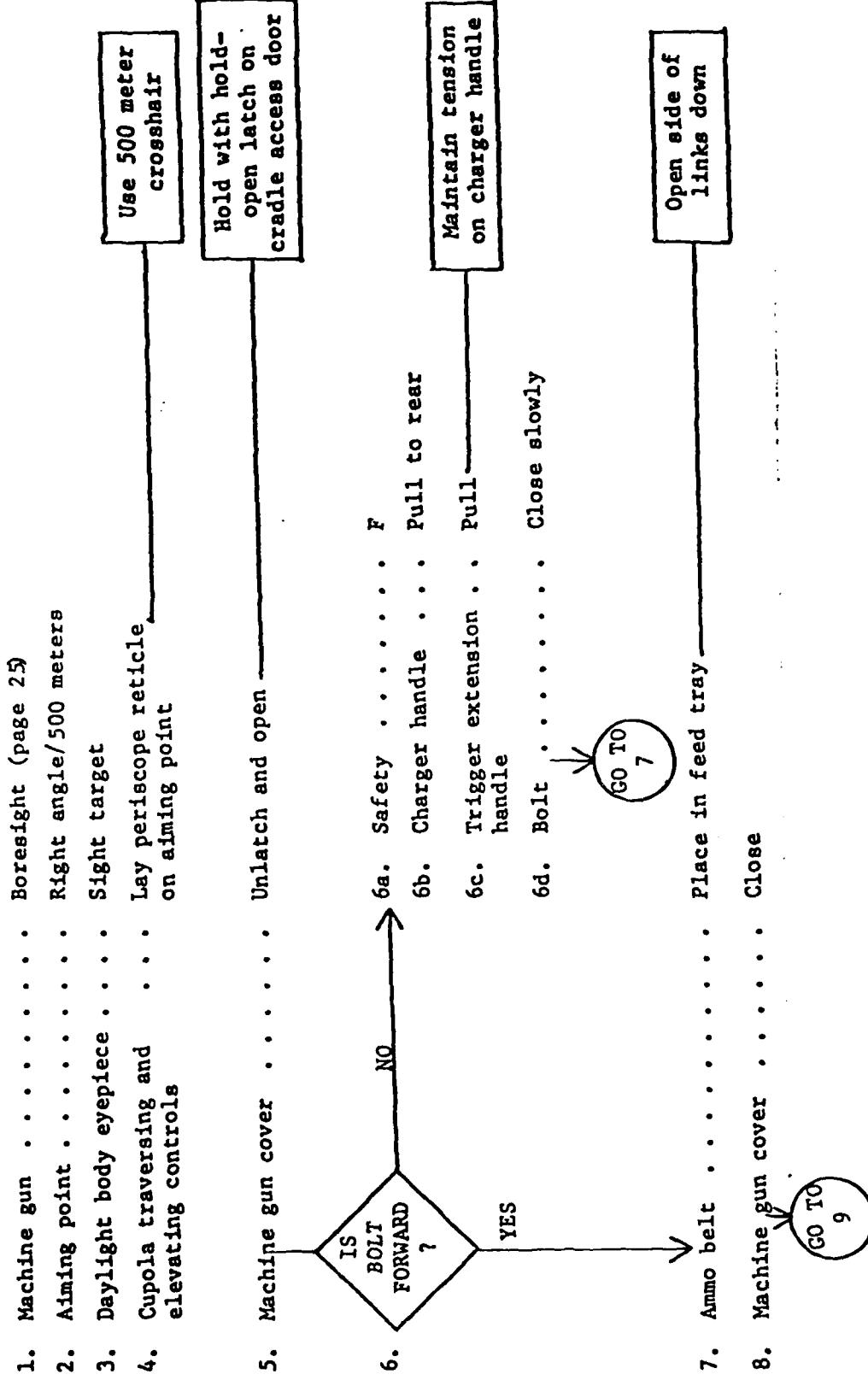
Force cartridge  
ejector to the  
left

GO TO  
39

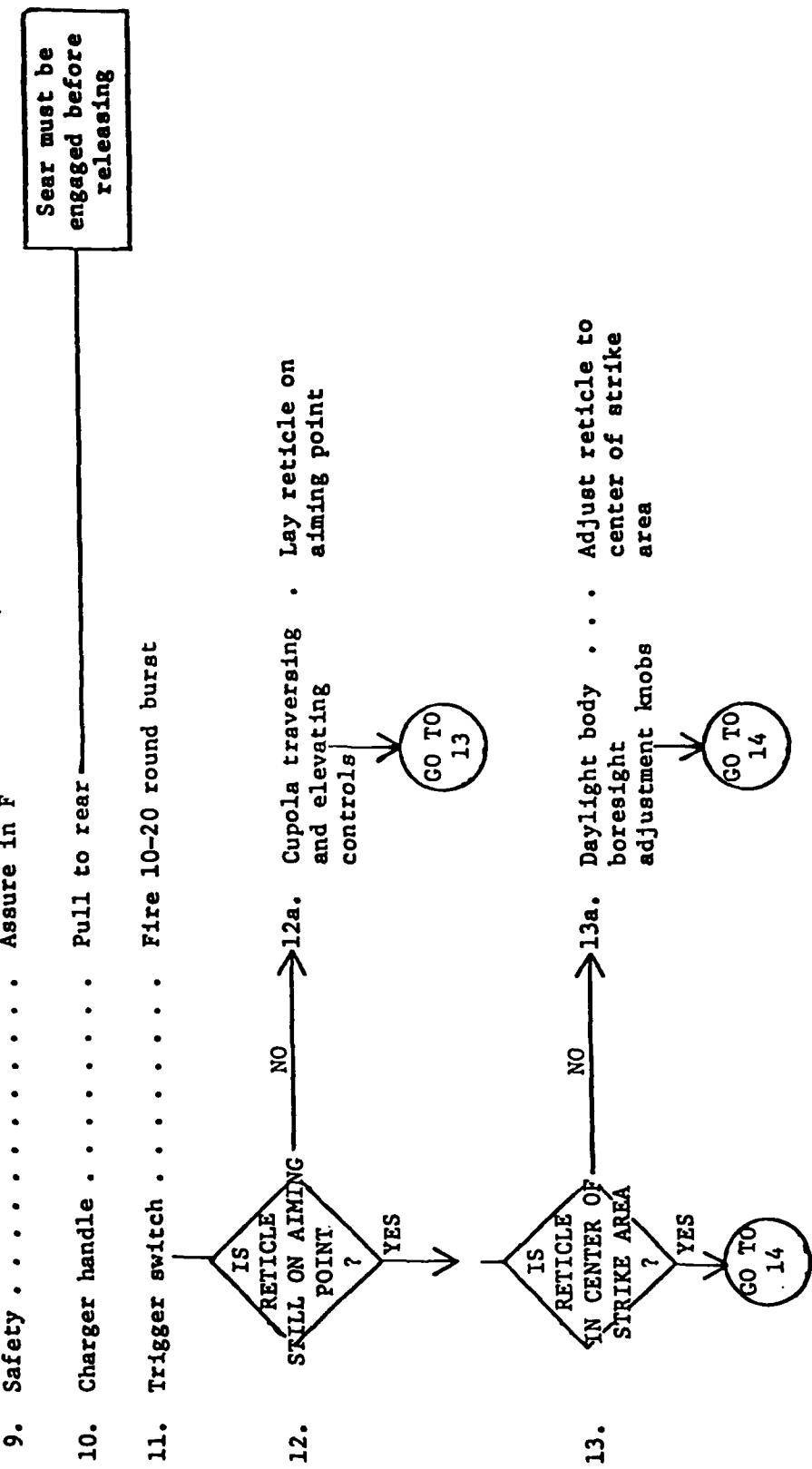
39. Sear assembly guide rails . . . Aline with grooves in receiver  
 Detent should engage
40. Sear assembly . . . . . Slide forward  
 Rotate rod 1/4 turn  
 in either direction  
 in receiver to secure
41. Bolt buffer group . . . . . Install  
 Depress lock and  
 raise latch  
 Should lock  
 and latch
42. Backplate group . . . . . Aline with grooves in receiver  
 Slide downward
43. Backplate group . . . . . Slide downward
44. Machine gun cover . . . . . Close
45. Cradle access door . . . . . Close
46. Cradle cover . . . . . Close  
 Place forward
47. Bolt . . . . . Place forward
48. Safety . . . . . F  
 M36El Periscope . . . . . Install (page 1)
49. M36El Periscope . . . . . Disconnect from stowage hanger/  
 connect to elevation arm assembly
50. Quick-disconnect clamp . . . . . Place in cupola ceiling  
 stowage clip
51. Stowage hanger . . . . .
- 

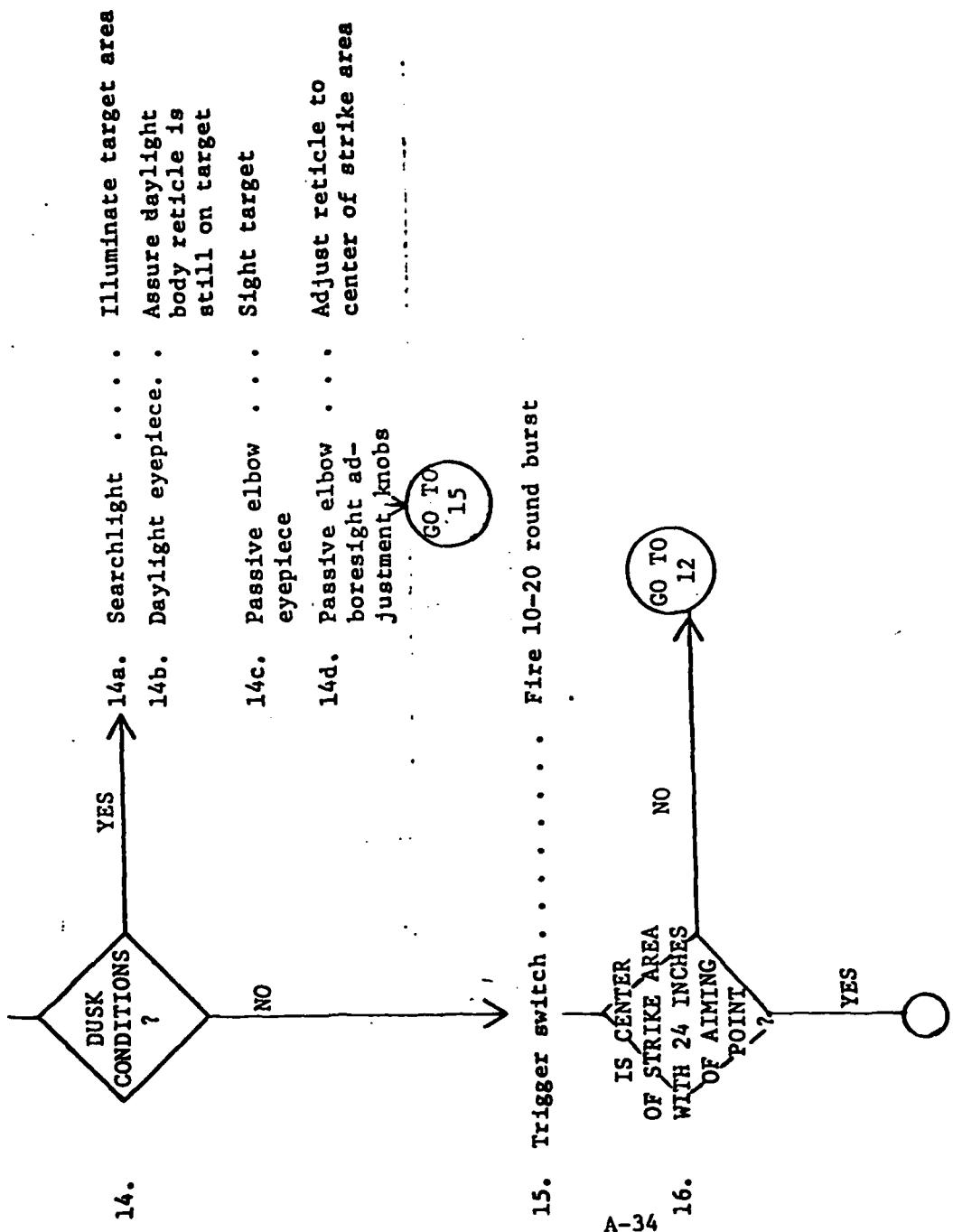
ZEROING CALIBER .50 MACHINE GUN

(TM page 2-397)



**SAFETY MUST BE IN F BEFORE CHARGING  
WEAPON. CHARGING IN S MAY CAUSE  
THE WEAPON TO FIRE ACCIDENTALLY.**





REMOVING CALIBER .50 MACHINE GUN

(TM page 3-122)

1. Machine gun • • • • • Clear (page 19)
2. CUPOLA POWER • • • • • OFF
3. Machine gun • • • • • Elevate
4. Solenoid lead connector • • • Disconnect from end plate
5. Cradle access doors • • • Open
6. Barrel • • • • • Rotate 1/4 turn/remove
7. Machine gun • • • • • Elevate

To disconnect solenoid  
lead connector

Press down on  
barrel latches

So that gun can slide  
under TC's periscope

LINK ASSEMBLY MUST BE CONNECTED TO  
STOWAGE HANGER BEFORE REMOVAL OF  
CAL .50 MACHINE GUN.

8. Quick-disconnect clamp • • • Disconnect from elevation arm
9. Elevation arm • • • • • Move toward rear of cupola
10. Quick-disconnect clamp • • • Connect to stowage hanger
11. Rear mounting pin • • • Remove
12. Machine gun • • • • • Slide from cradle

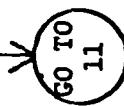
PREPARING TO FIRE PROCEDURE  
(TM page 2-400)

COMMAND: PREPARE TO FIRE

1. Exterior lenses and vision devices . . . . . Clean
2. Cupola ballistic periscope shield . . . . . Check operation
  
3. MASTER BATTERY . . . . . ON (driver)
  
4. Instrument lights . . . . . Check
5. LRF . . . . . Check for MALF light

COMMAND: CHECK FIRING SWITCHES

6. MAIN GUN . . . . . ON (gunner)
  
7. Engine . . . . . Start (driver)
8. 105-mm gun safety switch . . . . . In FIRE (loader)
9. Circuit tester . . . . . Insert (loader)
10. TC . . . . . Announces: ON THE WAY



- 34
- |                                                                                                                                                                                                                                                                                                                             |                                                                          |
|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------------------------------------------------------|
| <p>11. TC's control handle . . . . . Check trigger —</p> <p>12. Gunner's control handles . . . . . Check triggers (gunner)</p> <p>13. MAIN GUN . . . . . OFF (gunner)</p> <p>14. MACHINE GUN . . . . . ON (gunner)</p> <p>15. Coaxial machine gun . . . . . Cock (loader)</p> <p>16. TC . . . . . Announces: ON THE WAY</p> | <p>Loader announces<br/>NO FIRE if circuit<br/>tester does not light</p> |
| <p>17. TC's control handle . . . . . Check trigger —</p> <p>18. Gunner's control handles . . . . . Check triggers (gunner)</p>                                                                                                                                                                                              | <p>Loader announces<br/>NO FIRE if circuit<br/>tester does not light</p> |
- COMMAND: CHECK GUN CONTROLS
19. Gunner . . . . . Announces: POWER
20. Turret . . . . . Unlock (loader)
21. ELEV/TRAV POWER . . . . . ON (gunner)
22. Gun/turret . . . . . Elevate/traverse using  
TC power controls
- GO TO  
23

23. ELEV/TRAV POWER . . . . . OFF (gunner)

MAKE SURE THAT CREW IS READY AND  
NO PERSONNEL OR OBSTRUCTIONS ARE  
IN SURROUNDING AREA

COMMAND: CHECK GUN STABILIZATION

24. STAB ELECTRONICS . . . . . ON

25. POWER PACK BLOWER MOTOR . . . . . ON

26. ELEV/TRAV POWER . . . . . ON

27. POWER on selector assembly . . . . . ON

28. STAB . . . . . ON

29. Gunner . . . . . Announces: TURRET STABILIZED

30. TRAV and/or EL BALANCE . . . . . Rotate to null drift (gunner)

31. Gunner's control handles . . . . . Check function (gunner)

32. TC palm switch . . . . . Activate override

A-38

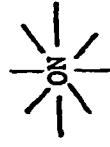
Wait 15 seconds

System is operational  
when green STAB  
indicator lights

GO TO  
33

33. TC control handles . . . . . Check function  
 34. STAB SHUT-OFF . . . . . Depress  
 35. POWER on selector assembly . . . . . OFF (gunner)  
 36. Gunner . . . . . Announces: STABILIZATION OFF

COMMAND: CHECK FIRE CONTROL



37. CUPOLA POWER . . . . . ON

38. GUN SAFETY . . . . . ON  
 39. Cal .50 machine gun . . . . . Check operation  
 40. XM21 computer . . . . . Perform self-test (gunner)  
 A-39  
 41. 105-mm gun . . . . . Prepare for boresighting (loader)  
 42. LRF . . . . . Perform self-test (page 8)  
 43. Gunner's telescope and . . . . . Boresight (gunner)  
 periscope  
 44. LRF . . . . . Boresight (page 14)  
 45. Ammo switch : . . . . . Select appropriate ammo (gunner)

GO TO  
46

46. MOVING/STATIONARY . . . . . Select appropriate  
setting (gunner)
47. Computer . . . . . Enter ballistic data (gunner)
48. Cal .50 machine gun . . . . . Boresight (page 18)
49. 7.62-mm machine gun . . . . . Load (loader)
50. 105-mm gun . . . . . Load (loader)
51. Cal .50 machine gun . . . . . Load

COMMAND: REPORT

52. Gunner/Driver/Loader . . . . . Announce: READY

DURING OPERATIONS PMCS  
(TM page 2-105)

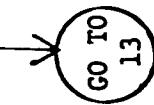
1. Commander's seat . . . . . Check operation/adjustment
2. Amplifier AM-1780/YRC . . . . Turn on
3. MONITOR . . . . . INT ONLY
4. VOLUME . . . . . Adjust
5. Radio/intercom . . . . . Check operation
6. Azimuth lock . . . . . Check operation
7. Azimuth interlock . . . . . Check operation
8. Azimuth lock . . . . . Unlock
9. Manual traversing handle . . . Traverse cupola right/left
10. Azimuth lock . . . . . Lock
11. Elevating handle . . . . . Depress/elevate Cal .50
12. TC control handles . . . . . Check operation

A-41

38

Check that  
cupola traverses  
smoothly

Check that  
machine gun  
elevates smoothly



- 
- ```
graph TD; 13[13. Gunner control handles . . . . .] --> 14[14. TC control handles . . . . .]; 14 --> 15[15. M36E1 Periscope ballistic . . .]; 15 --> 16[16. M36E1 Periscope window . . . . .]; 13 -. "Depress palm switch" .-> 13; 16 -. "Use cleaning compound and lens tissue" .-> 16; 16 --> 16c(( ));
```
13. Gunner control handles . . . . . Traverse turret (gunner)  
counterclockwise
  14. TC control handles . . . . . Override gunner and traverse  
turret clockwise
  15. M36E1 Periscope ballistic . . . Assure open  
shield
  16. M36E1 Periscope window . . . . . Clean

## TANK COMMANDER MASTER CHECK-OFF LIST

BEFORE OPERATIONS PMCS

(TM page 2-84)

CHECK	Equipment		
	Location	System	
	Exterior	Torsion Bars	Torsion Bars
		External Fire Extinguisher Handles	Safety Wire-Lead Seals
		Loader and TC Hatches	Hatches
		Hatches	Hold-Open Locking Handles
		Travel Lock	Travel Lock
	Loader's Station	Turret Lock	Turret Lock
	Gunner's Station	Manual Controls	Elevation Handle
		Driver's Hatch	Traversing Handle
	Driver's Station	Driver's Seat	Driver's Hatch
		Driver's Seat	Driver's Seat
		Backrest	X
		Dump Lever	X
		Escape Hatch	X
		Plunger Bolts	X
		Manual Control Lever	X
		Handle Seal	X
		Three Cylinders	X
		Lead Seal	X
		Shrunk Tubing	X
		Shifting Lever	X
		Pressure Gage	X
	Hydraulic Brake System	Brake Pedal	X
		Master Cylinder	X
		MASTER BATTERY	X
	Indicator Lamps	POWER PLANT WARNING	X

CHECK	Equipment	System	Location																						
				Door	Door Fasteners	Housing	Door Hinges	Drain Plug	Inspection Plugs	Top Deck Grille Doors	Engine Oil (Stopped)	Transmission Oil (Stopped)	Engine Oil (Idling)	Transmission Oil (Idling)	Screens	Coolers	Intake Hose	Outlet Hose	Intake Hose Elbow	Outlet Hose Elbow	Intake Hose Clamps	Outlet Hose Clamps	Air Cleaner Blower Motors	Restriction Indicators	Pipe Plug
		Air Cleaner Housings and Doors	Hull		X	X	X	X			X	X	X	X			X	X	X	X	X	X	X	X	
		Top Deck Grille Doors								X															
		Engine and Transmission Oil Level																							
		Engine and Transmission Oil Coolers																							
		Air Cleaner Elbows, Hoses, and Clamps																							
		Air Cleaner Blower Motors																							
		Restriction Indicators																							

TANK COMMANDER MASTER CHECK-OFF LIST  
DURING OPERATIONS PMCS  
(TM page 2-101)

CHECK		Equipment	Status
Location	System		
Driver's Station	Idle Speed/ Accelerator Control	Engine Speed at Idle Accelerator Control	X X
	Engine Speed After Acceleration	Engine Speed After Acceleration	X X
	Power Plant	Warning Light	X X
	Battery - Generator	Battery - Generator	X X
	Engine Oil Pressure	Engine Oil Pressure	X X
	Gages	Engine Oil Temperature	X X
		Transmission Oil Pressure	X X
		Transmission Oil Temperature	X X
	Controls	Steering Control	X X
		Shifting Control	X X
Loader's Station	Brake Pedal	Brake Pedal	X X
	Ammunition Stowage Racks/Ammunition Ready Racks	Stowage Rack Tubes and Retainers Ready Rack Locks Cushioning Pads	X X X X
	Seat	Seat	X X X X
	Commander's Intercom/Radio	Intercom/Radio	X X X X
	Cupola Azimuth and Elevation Controls	Azimuth Lock Azimuth Interlock Manual Traversing Handle Manual Elevating Handle	X X X X
Turret Power Controls	Turret Power Controls	Palm Switch Control Handles	X X
	TC's Periscope	Outside Window	X

TANK COMMANDER MASTER CHECK-OFF LIST  
 AFTER OPERATIONS PMCS  
 (TM page 2-110)

43

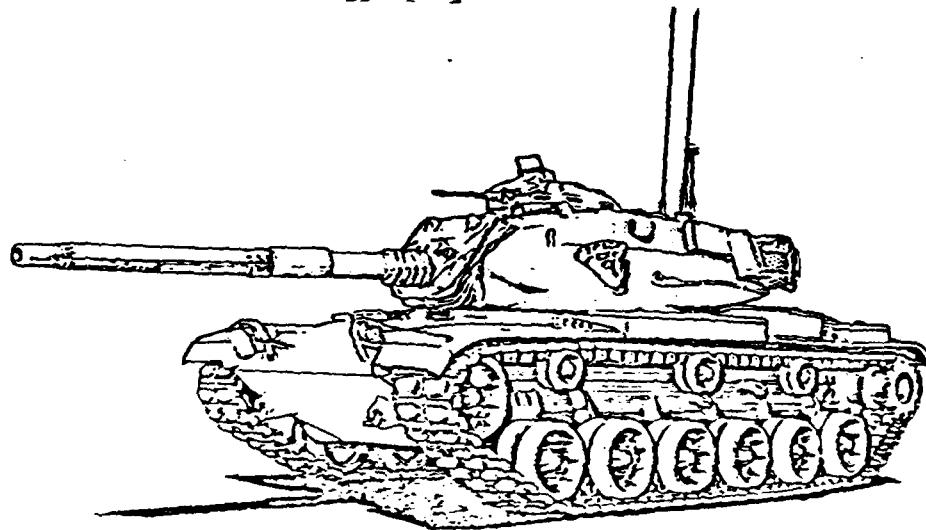
Location	System	Equipment	CHECK	
			Wear	Secure
Exterior/ Track	Rear Grille Doors	Rear Grille Doors	X	X
	Final Drive	Final Drive/Sprocket Bottom	X	X
	Mounting Studs		X	X
	Final Drive Hubs		X	X
	Sprockets		X	X
	Roadwheels		X	X
	Mounting Holes		X	X
	Hubs		X	X
	Inside Wheel Rims		X	X
	Roadwheel Arms	Roadwheel Arms	X	X
	Shock Absorbers	Shock Absorbers	X	X
	Track Support	Track Support Rollers	X	X
	Rollers and Hubs	Support Roller Hubs	X	X
	Track End	End Connectors	X	X
	Connectors	Bolts	X	X
	and Wedges	Wedges	X	X
	Track Center Guides	Track Center Guides	X	X
	Track Pads	Track Pads	X	X
	Track Adjusting	Link Assembly	X	X
	Links	Cotter Pin	X	X
	Track Shoes	Pins	X	X
	Shoes	Shoes	X	X
	Compensating Idler	Inside Wheel Rims	X	X
	Wheels and Hubs	Hub	X	X

CHECK										
	Leaks	In Place	Damaged	Clean/Clear	Adjustment	Position	Secure	Status		
Seat	X	X	X	X	X	X	X	X		
Fire Control										
Quadrant/Light										
Source Control										
Level Vial Cover										
Level Vial										
Light Source Control										
Glass Cover										
Rheostat										
Hydraulic Fluid										
Turret Power										
Controls/Hydraulic Power										
Gunner's Sights										

**GUNNER**

**PROCEDURE GUIDES**

**M60A3 TANK**



**July 1982**

**PREPARED BY THE U.S. ARMY RESEARCH INSTITUTE  
FOR THE  
BEHAVIORAL AND SOCIAL SCIENCES**

## GENERAL INFORMATION

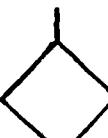
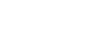
This booklet contains M60A3 gunner procedures guides. Each guide is for a single pre-operation, post-operation, or during operation activity. Each guide is matched to TM 9-2350-253-10 (Operator's Manual for Tank, Combat, Full-Tracked: 105-MM Gun, M60A3).

## PURPOSE OF PROCEDURE GUIDES

The guides in this booklet will not take the place of the M60A3 Operator's Manual or M60A3 training materials. The guides will aid you in remembering long or difficult sets of procedures. In short, the guides will help to "jog your memory."

## USE OF THIS BOOKLET

The Table of Contents (on the next page) lists the procedure guides in this booklet. Each guide gives you a step-by-step outline for completing an activity. The following instructions will help you to better use each guide.

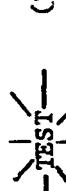
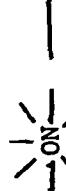
-  1. Some steps within a procedure are followed by a page number. On that page you will find a detailed breakdown of the step.
-  2. Some of the procedure guides include a question(s). Each question is stated inside a diamond shape. Your "yes" or "no" to the question will show you which path to follow.
-  3. Some paths lead to an instruction to go to a particular step number within a procedure. The step number is given within a circle.
-  4. Some steps within a procedure guide are followed by a box. In the box you will find more information on the step or a caution/warning.
-  5. Certain steps within a procedure guide require that a knob or switch be turned to a certain position. In some cases, that position might be written like the symbol to the left. The symbol means that a light should also come on.
- 6. At the beginning of each procedure, the TM page number reference for the procedure is given under the task name. These references will help you if you need more information to complete the task.
- 7. Two procedures are listed for boresighting with a boresighting device (taken from TRADOC Training Text 17-12-1) and without such a device (procedure in the Operator's Manual). Note that if a boresighting device is used, the zeroing procedure is not performed.

## TABLE OF CONTENTS

	<u>Page</u>
<b><u>GUNNER'S OPTICS</u></b>	
OPERATING TANK THERMAL SIGHT (TTS) . . . . .	1
OPERATING TELESCOPE M105D . . . . .	6
<b><u>COMPUTER SYSTEM</u></b>	
COMPUTER SELF-TEST . . . . .	9
OPERATIONAL RESPONSE TEST: . . . . .	14
RATE TACHOMETER AND LEAD CIRCUITRY . . . . .	14
WIND SENSOR TEST . . . . .	21
<b><u>MAIN GUN</u></b>	
BORESIGHTING WITH MUZZLE BORESIGHT DEVICE . . . . .	24
BORESIGHTING WITHOUT MUZZLE BORESIGHT DEVICE . . . . .	32
ZEROING 105-MM GUN . . . . .	43
<b><u>COAXIAL MACHINE GUN</u></b>	
TESTING 7.62-MM MACHINE GUN FIRING CIRCUIT . . . . .	53
BORESIGHTING 7.62-MM MACHINE GUN . . . . .	55
ZEROING 7.62-MM MACHINE GUN . . . . .	57
<b><u>PREPARING TO FIRE</u></b>	
PREPARING TO FIRE PROCEDURE . . . . .	59
<b><u>PREVENTATIVE MAINTENANCE CHECKS AND SERVICES (PMCS)</u></b>	
BEFORE OPERATIONS PMCS . . . . .	64
DURING OPERATIONS PMCS . . . . .	65
<b><u>PICTURES</u></b>	
GUNNER'S CONTROL UNIT . . . . .	67
GUNNER'S SWITCH BOX/STABILIZATION CONTROL SELECTOR . . . . .	68
AMMUNITION SELECT UNIT . . . . .	69

OPERATING TANK THERMAL SIGHT (TTS)  
(TM PAGE 2-236)

THE INFRARED OPTICS OF THE GUNNER'S PERISCOPE CONTAIN ANTIREFLECTIVE COATING WHICH IS SLIGHTLY RADIOACTIVE. DO NOT SWALLOW OR INHALE.

1. PMCS . . . . . Assure complete (crew)
2. MASTER BATTERY . . . . .  (driver)
3. MODE on LRF . . . . .  (TC) To prevent accidental firing of LRF
4. POWER on gunner's control unit . . . . .  Lift cover switch
5. MODE on TTS . . . . . 

ALWAYS LEAVE 4CB1 (CIRCUIT BREAKER)  
ON TTS POWER CONVERTER SET TO ON.

GO TO  
6

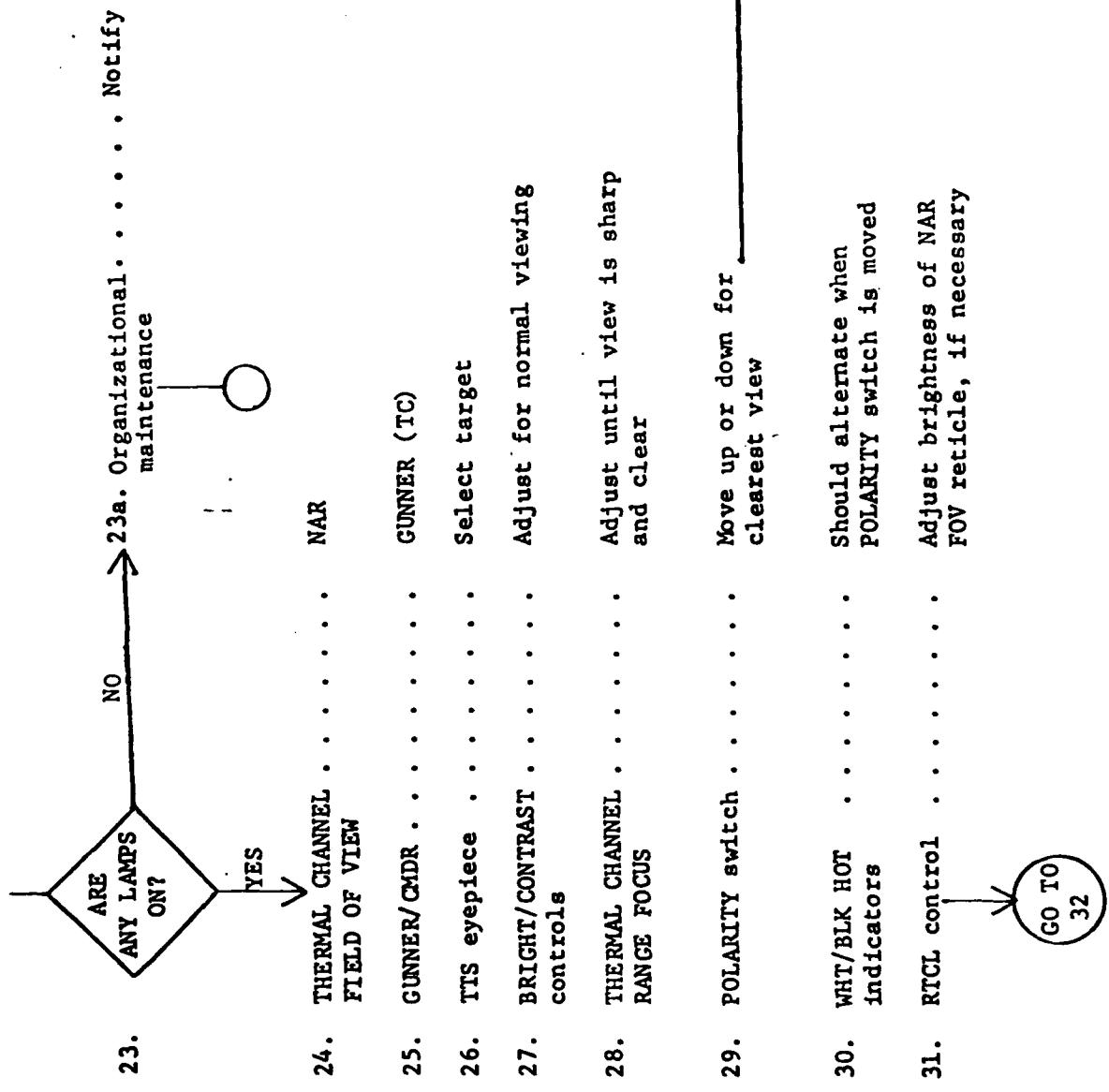
6. COOL indicator . . . . . Will light until thermal detector has cooled (< 15 mins)

THERMAL CHANNEL DISPLAY MAY BE USED BEFORE BITE DISPLAY COOL LAMP GOES OUT, BUT SYSTEM OPERATES BEST AFTER COMPLETE COOLDOWN.

7. Ballistic shield . . . . . Open
8. Daylight channel . . . . . Adjust
9. Unity power window . . . . . Assure view is sharp and clear
- B-5 10. RTCL control . . . . . Adjust until unity power reticle is visible
11. Daylight channel . . . . . Obtain image eyepiece
12. Diopter ring . . . . . Rotate to sharpen image
13. RTCL control . . . . . Adjust until daylight channel reticle is visible

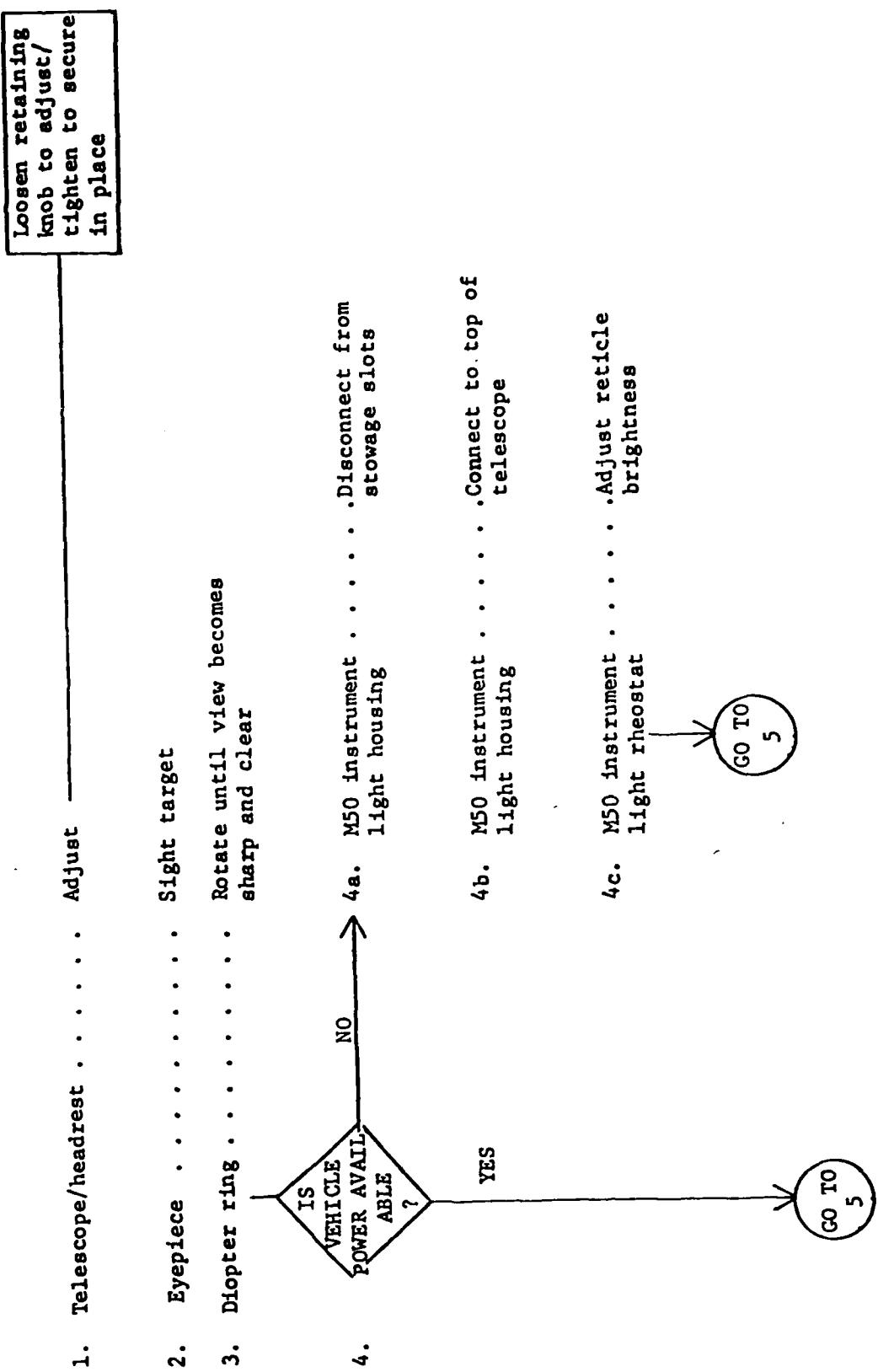
GO TO  
14

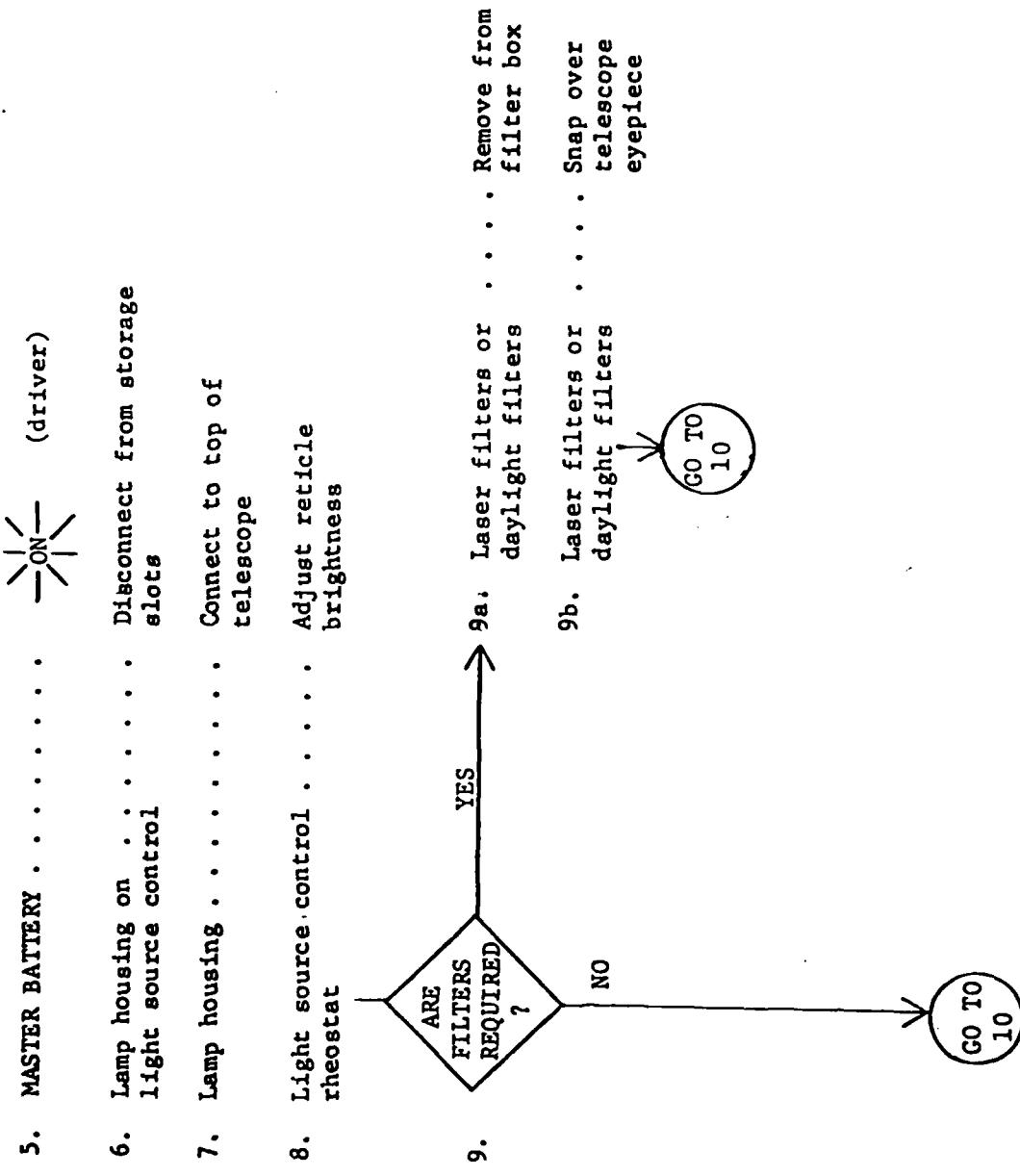
- 3
14. Filter selector lever . . . . . Select desired filter color  
 Push up to selected band color
15. Filter selector lever . . . . . Lock in place  
 Lever must point forward to prevent parallax
16. COOL indicator . . . . . Assure off
17. MODE on TRS . . . . . ON  
 —————— LAMP TEST ——————
18. BITE test switch . . . . .
19. BITE lamps . . . . . All should light
- B-6 20. BITE test switch . . . . . SYS TEST
21. BITE lamps . . . . . None should light
22. IS CABLE LAMP ON?  
 NO → 22a. Cable connectors . . . Check  
 YES → GO TO 23
-

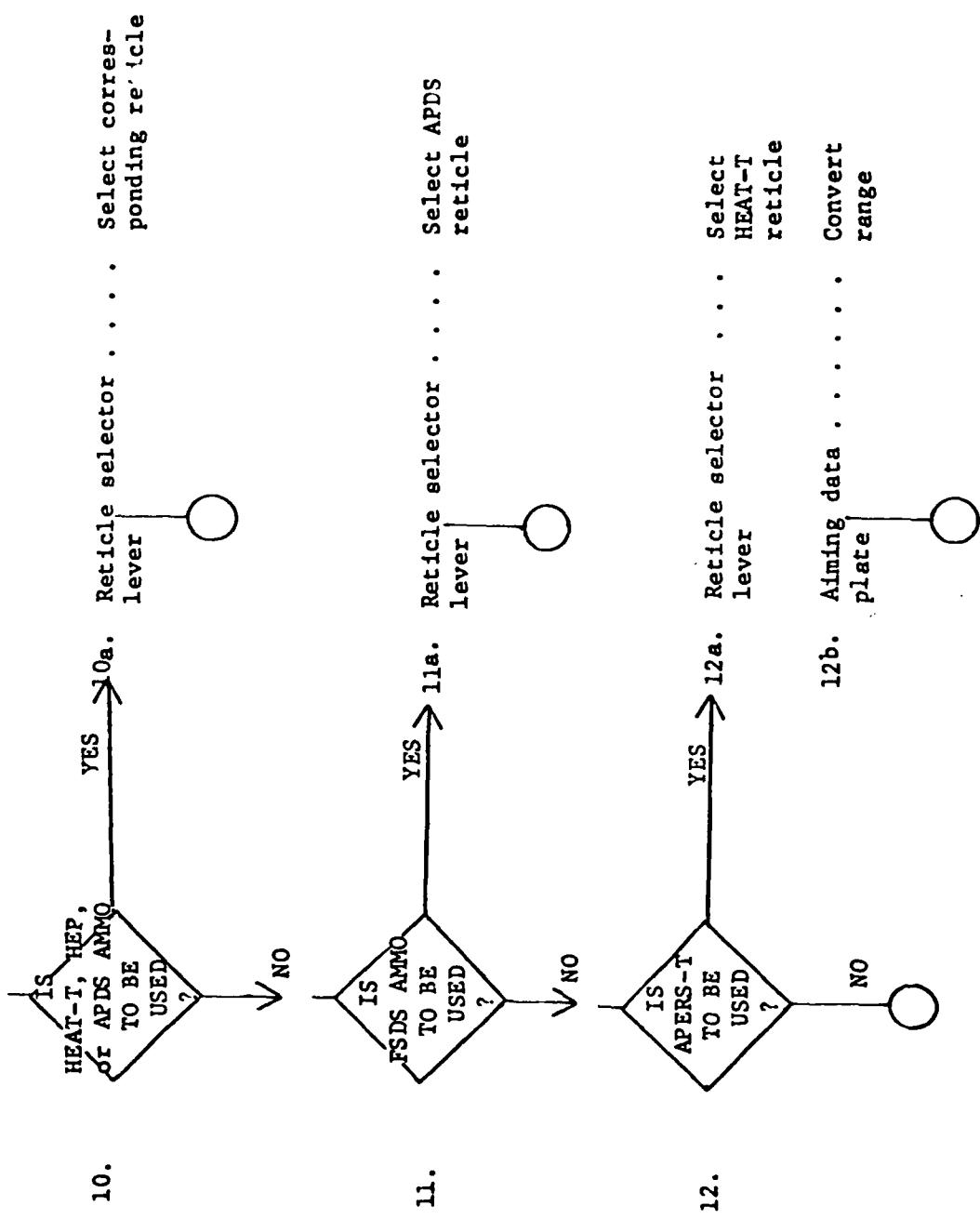


- 5
- |                                  |   |
|----------------------------------|---|
| 32. THERMAL CHANNEL . . . . .    | WIDE  |
| FIELD OF VIEW                    |   |
| 33. BRIGHT/CONTRAST . . . . .    | Readjust if necessary                                       |
| controls                         |   |
| 34. WFOV indicator . . . . .     | Assure on   |
| 35. RTCL control . . . . .       | Adjust brightness of WIDE<br>FOV reticle, if necessary      |
| 36. Commander's display eyepiece | Should have same image (TC)<br>as gunner's display          |
| 37. GUNNER/CMDR . . . . .        | CMDR (TC)   |
| 38. BRIGHT . . . . .             | Should control brightness (TC)                              |
| 39. CONTRAST . . . . .           | Should control contrast (TC)                                |
| 40. POLARITY . . . . .           | Should interchange light (TC)<br>and dark portions of image |
| 41. GUNNER/CMDR . . . . .        | GUNNER (TC)   |
| 42. MODE on TTS . . . . .        | STBY  |

OPERATING TELESCOPE M105D  
(TM PAGE 2-225)





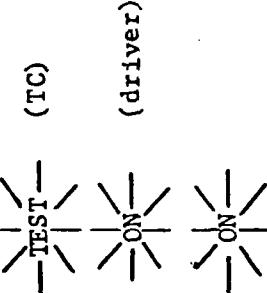


COMPUTER SELF-TEST  
(TM PAGE 2-254)

THE 105-MM GUN MAY MOVE WHEN ELEV/TRAV POWER SWITCH IS ON AND LAMP/NORMAL/SYSTEM SWITCH IS SET IN OR OUT OF SYSTEM OIL LAMP.

DO NOT PERFORM LRF SYSTEM SELF-TESTS WHILE PERFORMING COMPUTER SELF-TEST.

1. MODE on LRF . . . . .
2. MASTER BATTERY . . . . .
3. POWER on gunner's . . . . . control unit
4. LIGHTS . . . . .
5. LIGHTS . . . . .



B-12

Panel lights  
should vary smoothly  
from dim to bright

Vary brightness

- Adjust to normal brightness

GO TO  
6

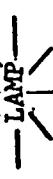
Indicators should  
vary smoothly  
in brightness

6. DIM/BRIGHT controls . . . . . Vary brightness —  
on ammo select units

7. HEAT ammo switch . . . . . Assure in M456 position



8. LAMP/NORMAL/SYSTEM . . . . .



9. SELF TEST and . . . . .  
SENSOR FAIL indicators  
All should illuminate

10. MANUAL/RANGEFINDER . . . . . MANUAL

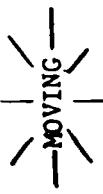


11. LAMP/NORMAL/SYSTEM . . . . .

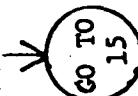


12. OK indicator . . . . . Should illuminate

13. STATIONARY or MOVING . . . . .  
Indicators on ammo  
select units  
Assure that one or the other  
indicator is illuminated

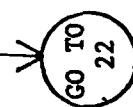


14. MOVING/STATIONARY . . . . .  
switch on either unit



- |     |   |   |   |   |   |   |
|-----|---|---|---|---|---|---|
|     |  |  |  |  |  |  |
| 15. | MOVING/STATIONARY<br>switch on gunner's<br>unit                                   | • • •   | — STATIONARY —  | — MOVING —  | — STATIONARY —  | — MOVING —  |
| 16. | MOVING/STATIONARY<br>switch on commander's<br>unit                                | • • •   | — MOVING —  | — STATIONARY —  | — STATIONARY —  | — MOVING —  |
| 17. | MOVING/STATIONARY<br>switch on gunner's<br>unit                                   | • • •   | — STATIONARY —  | — STATIONARY —  | — STATIONARY —  | — MOVING —  |
| 18. | MOVING/STATIONARY<br>switch on commander's<br>unit                                | • • •   | — STATIONARY —  | — STATIONARY —  | — STATIONARY —  | — MOVING —  |
| 19. | Gunner's ammo select<br>unit switches   | • • •   | Depress each of the<br>four in sequence   |
| 20. | Commander's ammo<br>select unit switches  | • • •   |   |   |   |   |

B-14



WIND SENSOR MUST BE INSTALLED AND OPERABLE FOR A COMPLETE TEST. THE WIND SENSOR FAIL INDICATOR WILL LIGHT IF MANUAL WIND IS SELECTED OR IF WIND SENSOR IS NOT INSTALLED AND PROPERLY CONNECTED.

22. Ammo select unit . . . . . Select ammo type

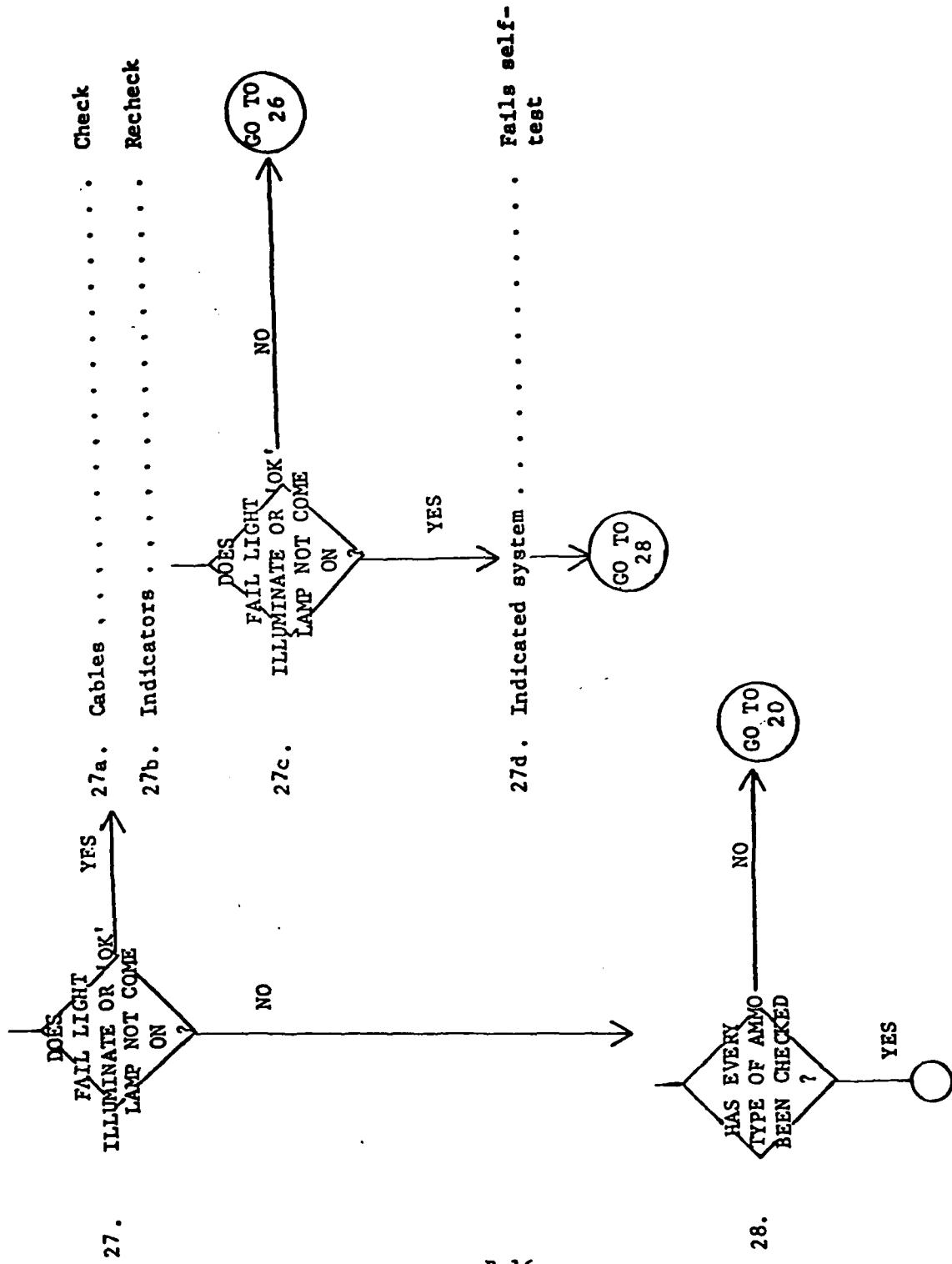


23. LAMP/NORMAL/SYSTEM . . . . .

- |                              |                               |
|------------------------------|-------------------------------|
| 24. OK indicator . . . . .   | Should illuminate             |
| 25. RANGE (METERS) . . . . . | Should indicate $1850 \pm 15$ |
| 26. RETURN . . . . .         | Should indicate 2             |

B-15





OPERATIONAL RESPONSE TEST:  
(TM PAGE 2-258)

RATE TACHOMETER AND LEAD CIRCUITRY

1. MODE on LRF . . . . . — TEST — (TC)
  2. MASTER BATTERY . . . . . — ON — (driver)
  3. POWER on gunner's control unit . . . . . — ON —
  4. MANUAL/ RANGEFINDER . . . . . MANUAL
  5. RANGE METERS X100 . . . . . 20
  6. CROSSWIND AUTO/MANUAL . . . . . MANUAL
  7. CROSSWIND MPH . . . . . 0 MPH
  8. MOVING/STATIONARY — STATIONARY —
  9. HEAT switch . . . . . Depress
- Heat switch  
should become  
brighter than  
other three
- GO TO  
10

10. Obstructions . . . . . Clear from tank and surrounding area

MAKE SURE CREW IS IN SAFE POSITION BEFORE OPERATING GUN ELEVATING AND TURRET TRAVERSING CONTROLS.

11. Gun tube . . . . . Release from travel lock

12. Travel lock . . . . . Stow

13. Turret . . . . . Unlock

14. Engine . . . . . Start (driver)

Set speed at  
800-900 rpm

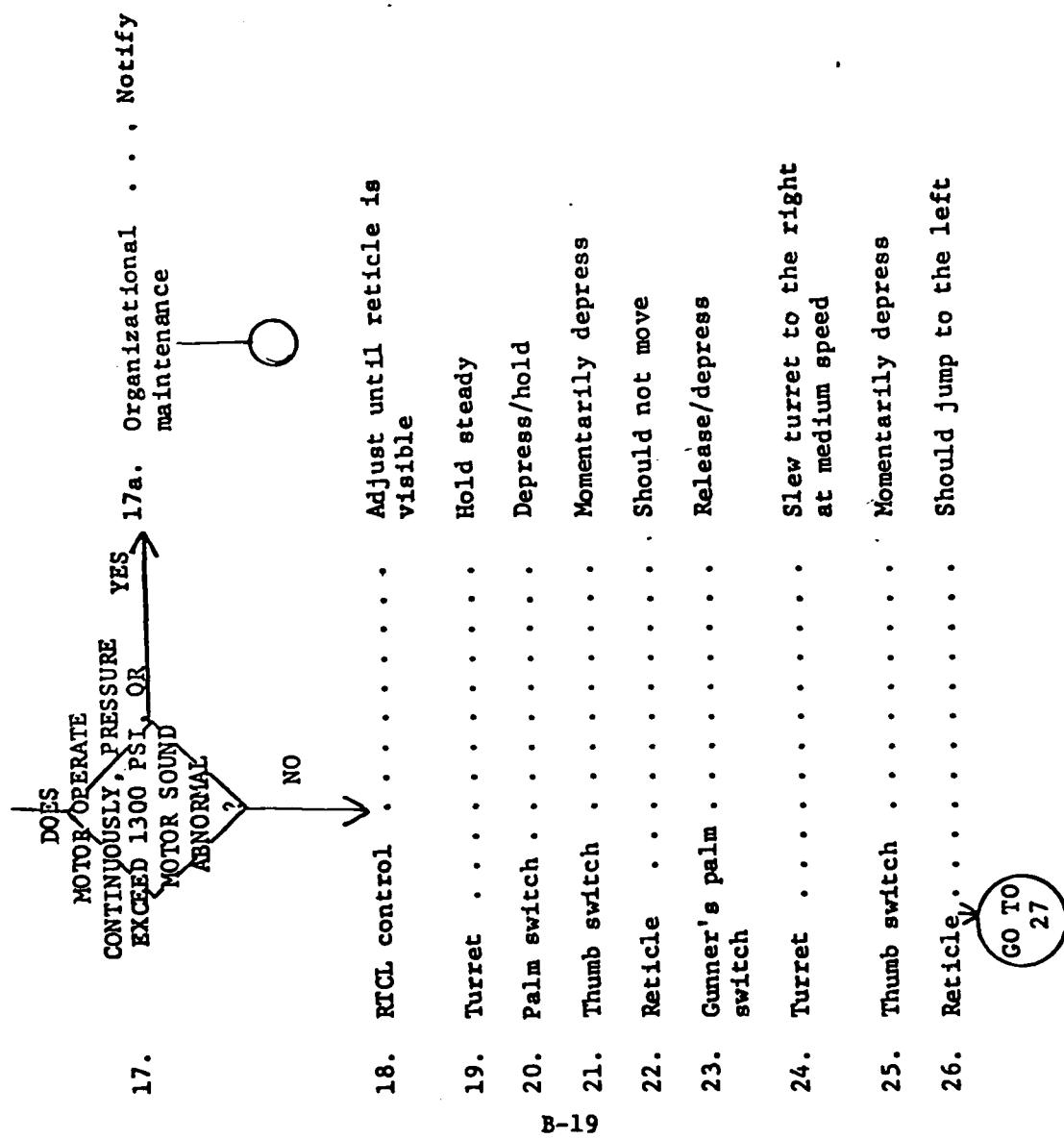
MAKE SURE MANUAL TRAVERSING HANDLE LOCKING LEVER IS IN DETENT POSITION.



15. ELEV/TRAV POWER . . . . .

16. Turret hydraulic power pack motor . . . . . Should run until accumulator pressure gage reads 1175-1275 psi

GO TO  
17



27. Palm switch . . . . . Release
28. Reticle . . . . . Should jump to the right
29. Palm switch . . . . . Depress/hold
30. Turret . . . . . Slew turret to the left at medium speed
31. Thumb switch . . . . . Momentarily depress
32. Reticle . . . . . Should jump to the right
33. Palm switch . . . . . Release
34. Reticle . . . . . Should jump to the left
35. HAVE TC's RETICLE/CONTROLS BEEN CHECKED ?

TC's control . . . . . Use to control deflection/elevation

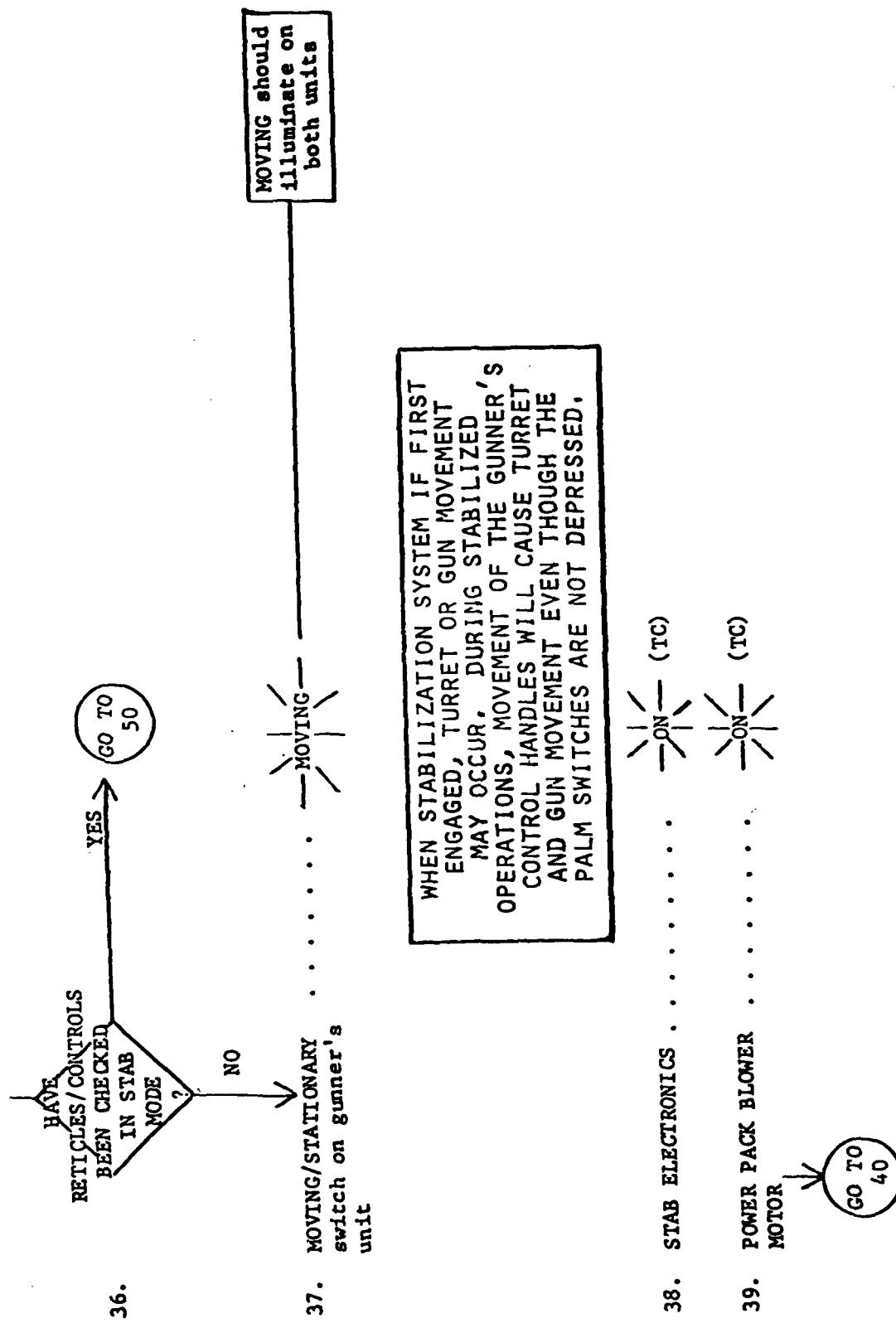
NO → 35a.

TC's handle

YES

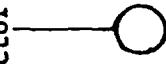
GO TO  
19

GO TO  
36



40. POWER on Stabilization control selector      . . . . .      → ON → ON  
  
 Wait 15 seconds
41. Gunner      . . . . .      Announces: STAB
42. STAB      . . . . .      → ON → ON  

43. STAB SHUT-OFF      . . . . .      Should be on  
 Indicators at TC and loader's stations
- DO NOT OPERATE STABILIZATION SYSTEM  
 UNLESS POWER PACK BLOWER MOTOR COMES ON.
- A DRIFT RATE OF 2 MILS/MIN IS ACCEPTABLE AFTER ADJUSTING BOTH TRAV BALANCE AND ELEV BALANCE KNOBS.
44. TRAV BALANCE      . . . . .      Rotate clockwise until drift occurs/note position  
 knob
- GO TO 45

45. TRAV BALANCE . . . . .      Rotate counterclockwise  
knob                                    until drift occurs/  
note position
46. TRAV BALANCE . . . . .      Set halfway between  
knob                                    first and second position
47. ELEV BALANCE . . . . .      Rotate clockwise until  
knob                                    drift occurs/note  
position
48. ELEV BLAANCE . . . . .      Rotate counterclockwise  
knob                                    until drift occurs/  
note position
49. ELEV BALANCE . . . . .      Set halfway between  
knob                                    first and second position
- GO TO  
19
50. POWER on stabiliza- . . . . .      OFF  
tion control                            selector
- 

OPERATIONAL RESPONSE TEST:  
(TM PAGE 2-276)

WIND SENSOR TEST

1. MODE on LRF . . . . . — TEST — (TC)
2. MASTER BATTERY . . . . . — ON — (driver)
3. POWER on gunner's control unit . . . . . — ON —
4. ELEV/TRAV POWER . . . . . — ON —
5. MOVING/STATIONARY . . . . . — STATIONARY —
6. Ammo select unit . . . . . — HEP/WP —
7. MANUAL/RANGEFINDER . . . . . MANUAL
8. RANGE METERS X100 . . . . . 30
9. CROSSWIND AUTO/MANUAL . . . . . MANUAL

GO TO  
10

- |     |                           |  |
|-----|---------------------------|--|
| 10. | CROSSWIND MPH . . . . .   | 0 MPH  |
| 11. | Tank . . . . .            | Position in left-to-right crosswind                        |
| 12. | Gunner's control handles  | Lay vertical bar of 8 X daylight reticle on distant target |
| 13. | CROSSWIND MPH . . . . .   | 5 MPH from the left  |
| 14. | Reticle . . . . .         | Should move to the right                                   |
| 15. | CROSSWIND MPH . . . . .   | 0 MPH  |
| 16. | Reticle . . . . .         | Should return to aiming point                              |
| 17. | CROSSWIND AUTO/<br>MANUAL | AUTO   |
| 18. | Reticle . . . . .         | Should move to the right                                   |
| 19. | CROSSWIND AUTO/<br>MANUAL | MANUAL   |
| 20. | Reticle . . . . .         | Should return to aiming point                              |



GO TO  
21

**MAKE SURE SURROUNDING AREA IS  
CLEAR FOR 360° OF TURRET TRAVERSE**

21. Turret . . . . . Traverse 180°
22. Gunner's control handles . . . . . Lay vertical bar of 8X daylight reticle on distant target
23. CROSSWIND MPH . . . . . 5 MPH from the right
24. Reticle . . . . . Should move to the left
25. CROSSWIND MPH . . . . . 0 MPH
26. Reticle . . . . . Should return to aiming point
- B-26 27. CROSSWIND AUTO/  
MANUAL . . . . . AUTO
28. Reticle . . . . . Should move to the left
29. CROSSWIND AUTO/  
MANUAL . . . . . AUTO
30. Reticle . . . . . Should return to aiming point

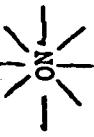
23

**BORESIGHTING WITH MUZZLE BORESIGHT DEVICE**

(TT 17-12-1)

Prepare

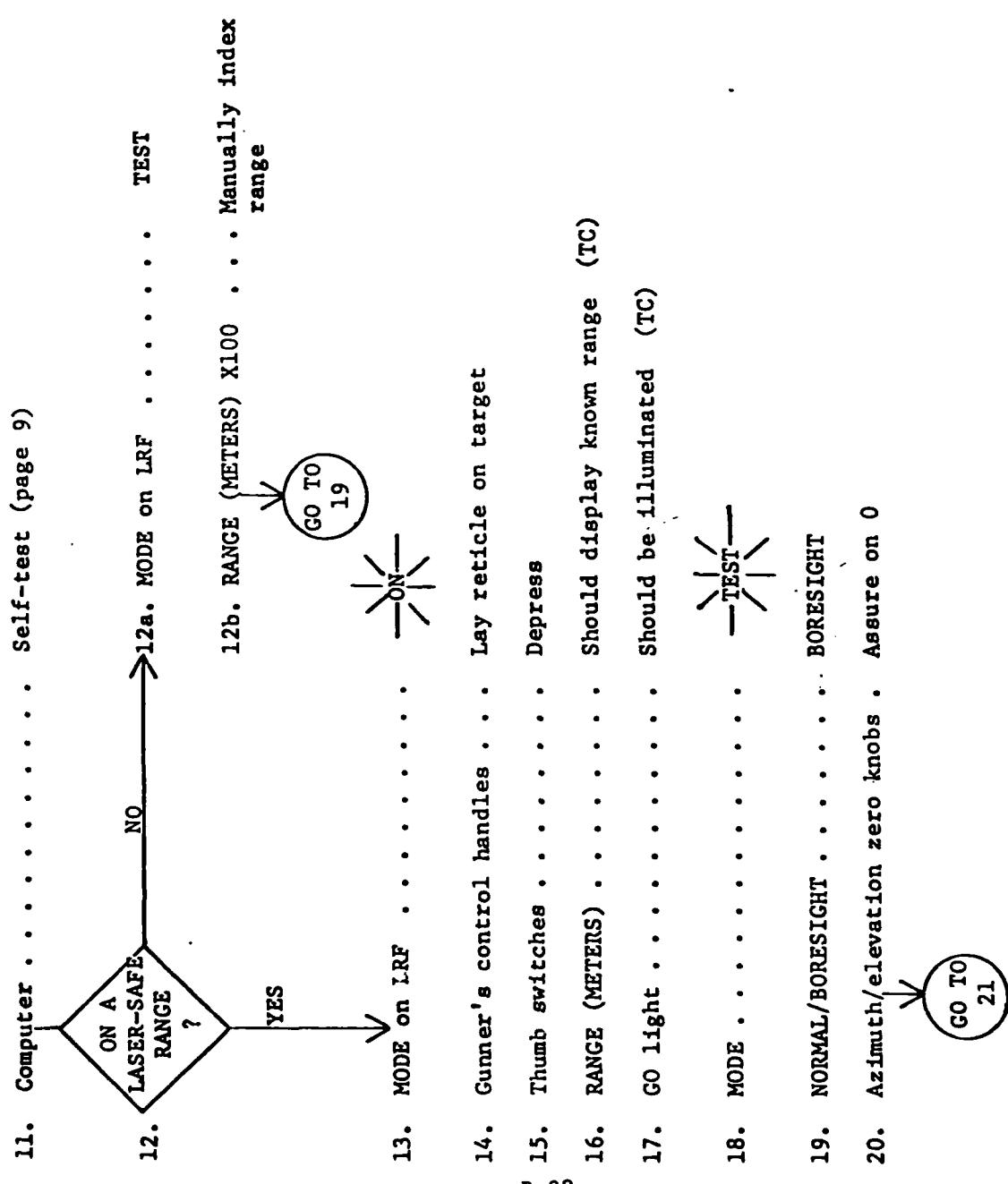


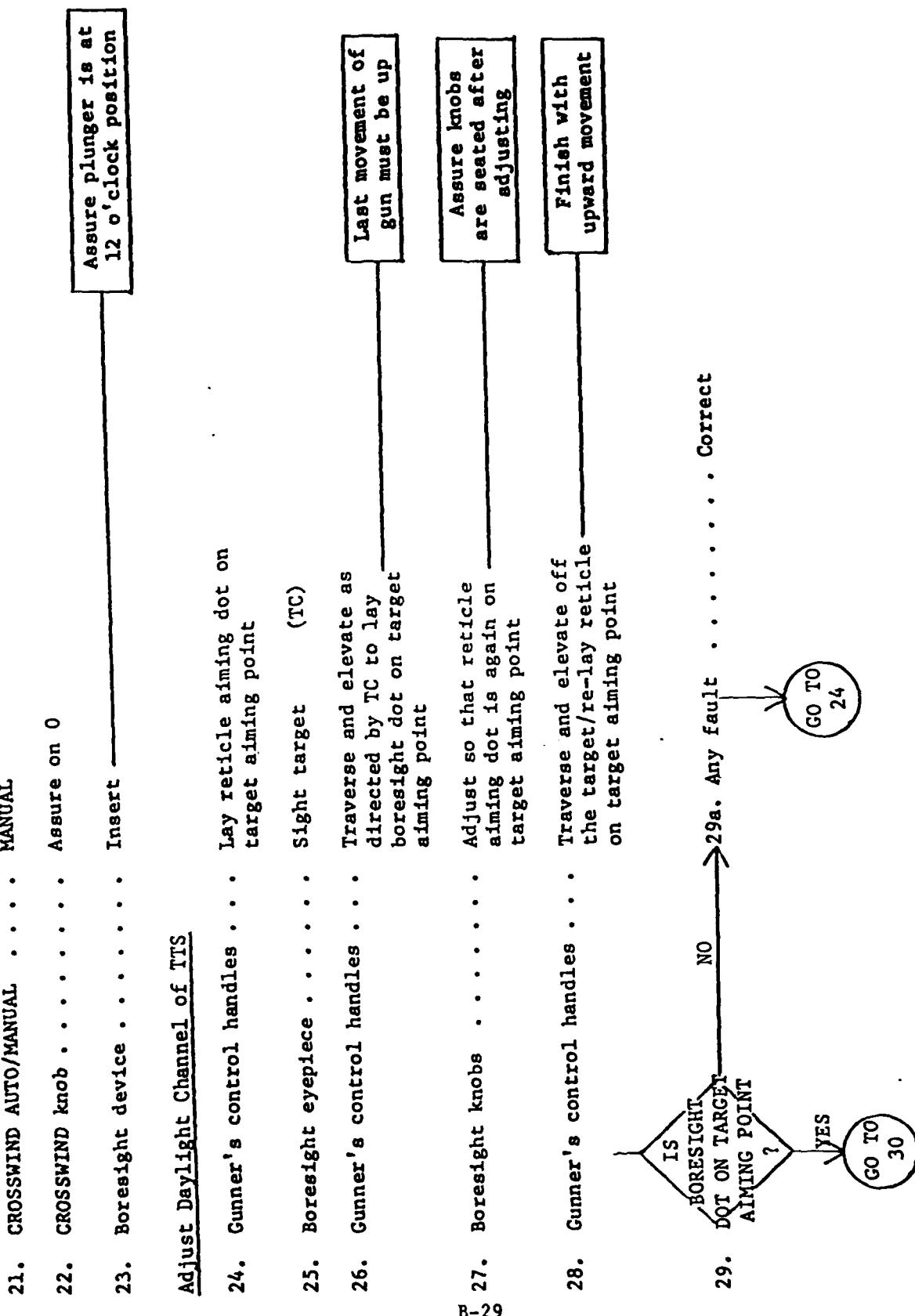
1. ELEV/TRAV POWER . . . . . 
2. Tank position . . . . . Level
3. All weapons . . . . . Clear
4. Main gun breech . . . . . Open
5. Engine . . . . . Assure off
6. Target . . . . . 1200 meters
7. Ballistic drive . . . . . Down/locked coupling lever
8. Filter select lever . . . . . Locked into position
9. POWER on gunner's . . . . . control unit 
10. Laser rangefinder . . . . . Self-test (TC)

B-27

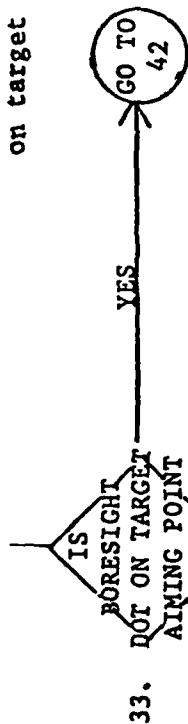
Lever must  
point forward,  
away from gunner

GO TO  
11





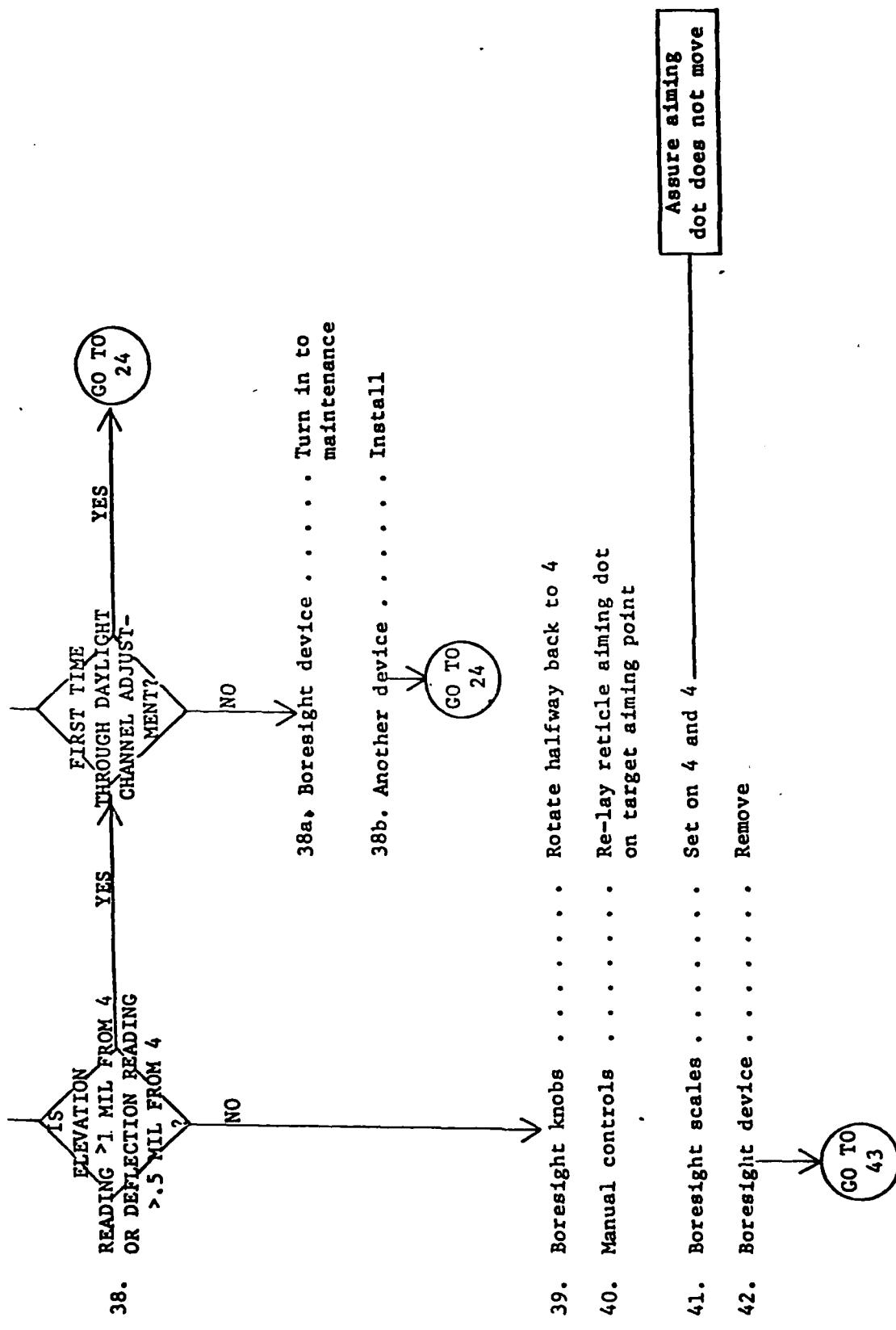
30. Boresight scales . . . . . Set on 4 and 4  
 31. Boresight device . . . . . Remove/rotate 180°/reinstall  
 32. Gunner's control handles . . . Traverse and elevate off  
     the target/re-lay reticle  
     on target aiming point



- B-30
34. Boresight eyepiece . . . . . Sight target (TC)  
 35. Gunner's control handles . . . Traverse and elevate as  
     directed by TC to lay  
     boresight dot on target  
     aiming point
36. Boresight knobs . . . . . Adjust so that reticle  
     aiming dot is again on  
     target aiming point
37. Gunner . . . . . Announce boresight  
     knob readings

GO TO 38

Last movement of  
gun must be up



Adjust the M105D Telescope

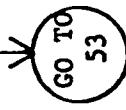
43. M105D Telescope . . . . . Prepare for operation  
(Page 6)
44. Reticle selector . . . . . Move to full-left or full-right position
45. Boresight knobs . . . . . Adjust boresight cross on target aiming point
46. Boresight scales . . . . . Set on 3 and 3

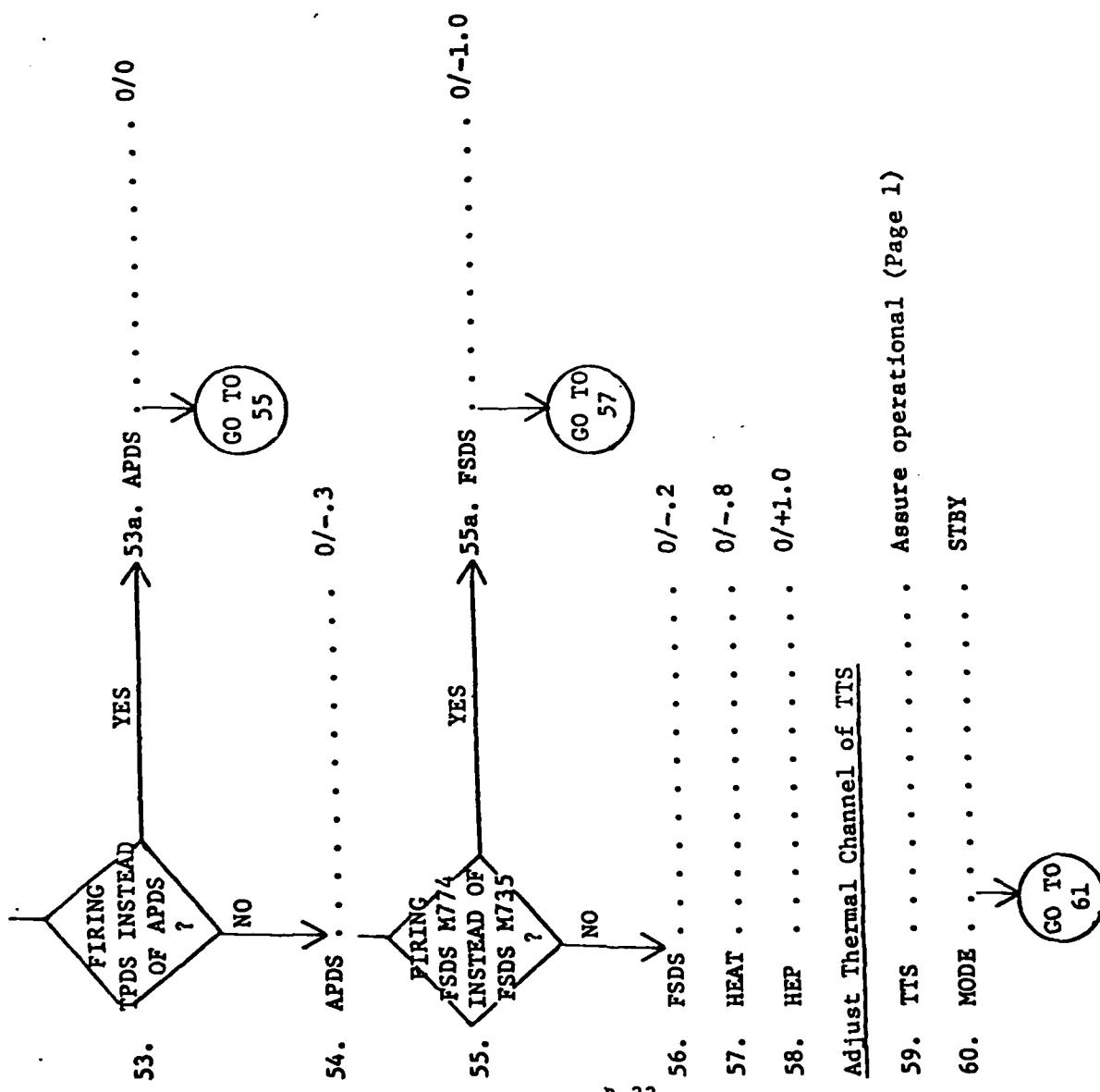
Adjust the Laser Rangefinder (LRF)

47. BATL RNG . . . . . Press
48. Gunner's sight . . . . . Assure on target aiming point
49. 6X/12X switch . . . . . 12X
50. LRF boresight knobs . . . . . Adjust reticle on target aiming point
51. Boresight scales . . . . . Set on 4 and 4

Apply Computer Correction Factors

52. COMMON ZERO . . . . . 0/0 (azimuth/elevation)





61. GUNNER/CDR . . . . . GUNNER (TC)
62. COOL indicator . . . . . Assure off
63. MODE . . . . . . . . . ON
64. THERMAL CHANNEL . . . . . NAR  
FIELD OF VIEW
65. THERMAL CHANNEL . . . . . Adjust for sharpest view  
RANGE FOCUS
66. BRIGHT/CONTRAST controls . . . . . Adjust for normal scene
67. POLARITY switch . . . . . Set for best image
68. RTCL control . . . . . . . . . Adjust until reticle is  
just visible
69. Thermal channel eyepiece . . . . . Sight target
70. THERMAL CHANNEL . . . . . BORESIGHT EL/AZ  
Set on 4 and 4  
target aiming point
71. Bore sight scales . . . . . Set on 4 and 4  
target aiming point
72. Zeroing procedure . . . . . Do not perform

Assure aiming dot  
does not move

BORESIGHTING WITHOUT MUZZLE BORESIGHT DEVICE

(TM PAGE 2-345)

Preliminary Procedure

1. Tank . . . . . Level ground

2. Cross-threads . . . . . Place on muzzle end of gun tube  
Threads should be directly over witness marks

3. Target . . . . . 1200 meters

4. Breechblock crank stop . . . . Assure rearward

BREECHBLOCK OPERATING HANDLE IS UNDER SPRING TENSION UNTIL BREECHBLOCK IS FULLY OPENED AND LOCKED BY EXTRACTORS.

5. Breechblock operating . . . . Pull rearward/down handle  
Depress plunger

FAILURE TO RETURN OPERATING HANDLE TO LATCHED POSITION MAY CAUSE INJURY TO PERSONNEL OR DAMAGE TO CLOSING MECHANISM WHEN BREECHBLOCK IS CLOSED.

6. Operating handle . . . . . Return to latched position

GO TO  
7

7. Breech . . . . . Close

Trip extractors using  
empty case or  
wooden block

**KEEP HANDS CLEAR OF BREECH.**

8. Firing pin spring . . . . . Release

Depress and  
move plunger  
to the right

9. Spring retainer . . . . . Remove

Turn counter-  
clockwise until  
lug alines with  
grooves

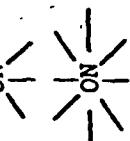
10. Firing pin/retractor . . . . . Remove

Pry out with  
screwdriver blade

11. MASTER BATTERY . . . . .



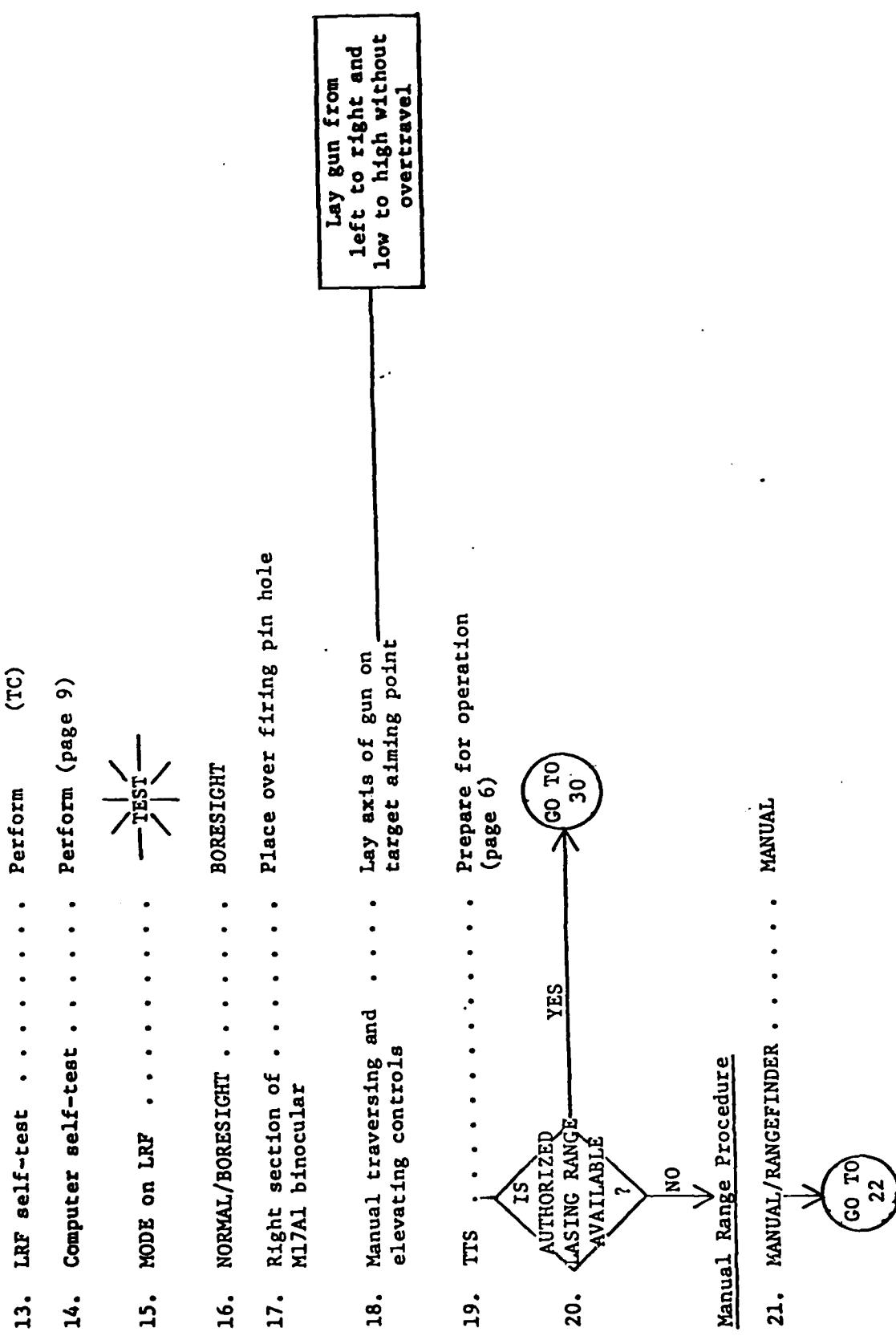
(driver)



12. POWER on gunner's  
control unit . . . . .

**IF THERE IS APPARENT RETICLE MOTION  
DURING BORESIGHTING, INCREASE ENGINE  
RPM OR TURN ENGINE OFF.**

GO TO  
13





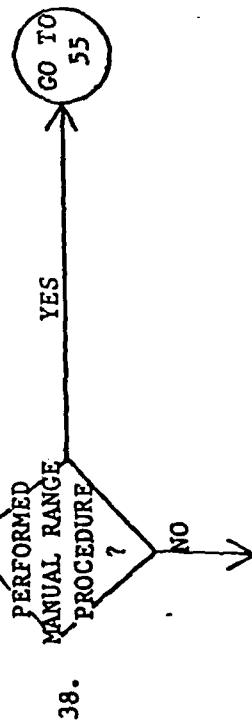
22. MODE on LRF . . . . .
  23. RANGE (METERS) . . . . . Should display 0000
  24. RANGE METERS X100 . . . . . Dial to target distance
  25. RETICLE BRIGHTNESS . . . . . Adjust until reticle is just visible
  26. 6X/12X . . . . . 12X
  27. DEFLECTION and ELEVATION . . . Lay reticle on target aiming point
  28. Slip scales . . . . . Set on 4 and 4
  29. Reticle/crossthreads . . . . . Assure on target aiming point
- M105D Telescope Boresight Procedure
30. M105D Telescope . . . . . Prepare for operation (page 6)
  31. Eyepiece . . . . . Sight

GO TO  
32

Lay reticle from  
low to high and  
left to right without  
overtravel

TELESCOPE MUST BE BORESIGHTED  
AT 1200 METERS ONLY.

32. Reticle selector . . . . . Choose appropriate reticle
33. Locking levers . . . . . Unlock telescope boresight knobs
34. Boresight knobs . . . . . Lay boresight cross on target aiming point
35. Slip scales . . . . . Set on 3 and 3
36. Locking levers . . . . . Lock telescope boresight knobs
37. Boresight cross/ crosshairs . . . . . Assure on target aiming point



B-39

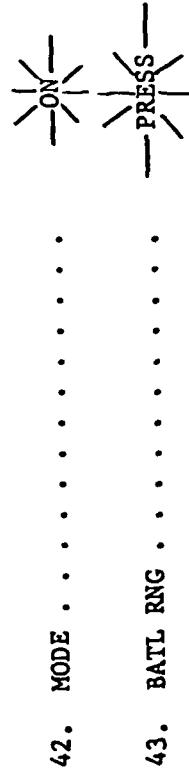
DO NOT VIEW LASER BEAM THROUGH DEVICE NOT FILTERED FOR LASER LIGHT, FIRE LASER IN AUTHORIZED LASING AREA ONLY.

Laser Rangefinder (LRF) Procedure

39. Laser filter . . . . . • • • • • Install on receiver-transmitter eyepiece

40. RETICLE BRIGHTNESS . . . . . • • • Adjust until reticle is just visible

41. MANUAL/RANGEFINDER . . . . . • • • RANGEFINDER



**DO NOT LEAN OR PUSH AGAINST RECEIVER-TRANSMITTER WHEN VIEWING THROUGH EYEPiece OR LASING.**

B-40

44. 6X/12X . . . . . • • • • • 12X

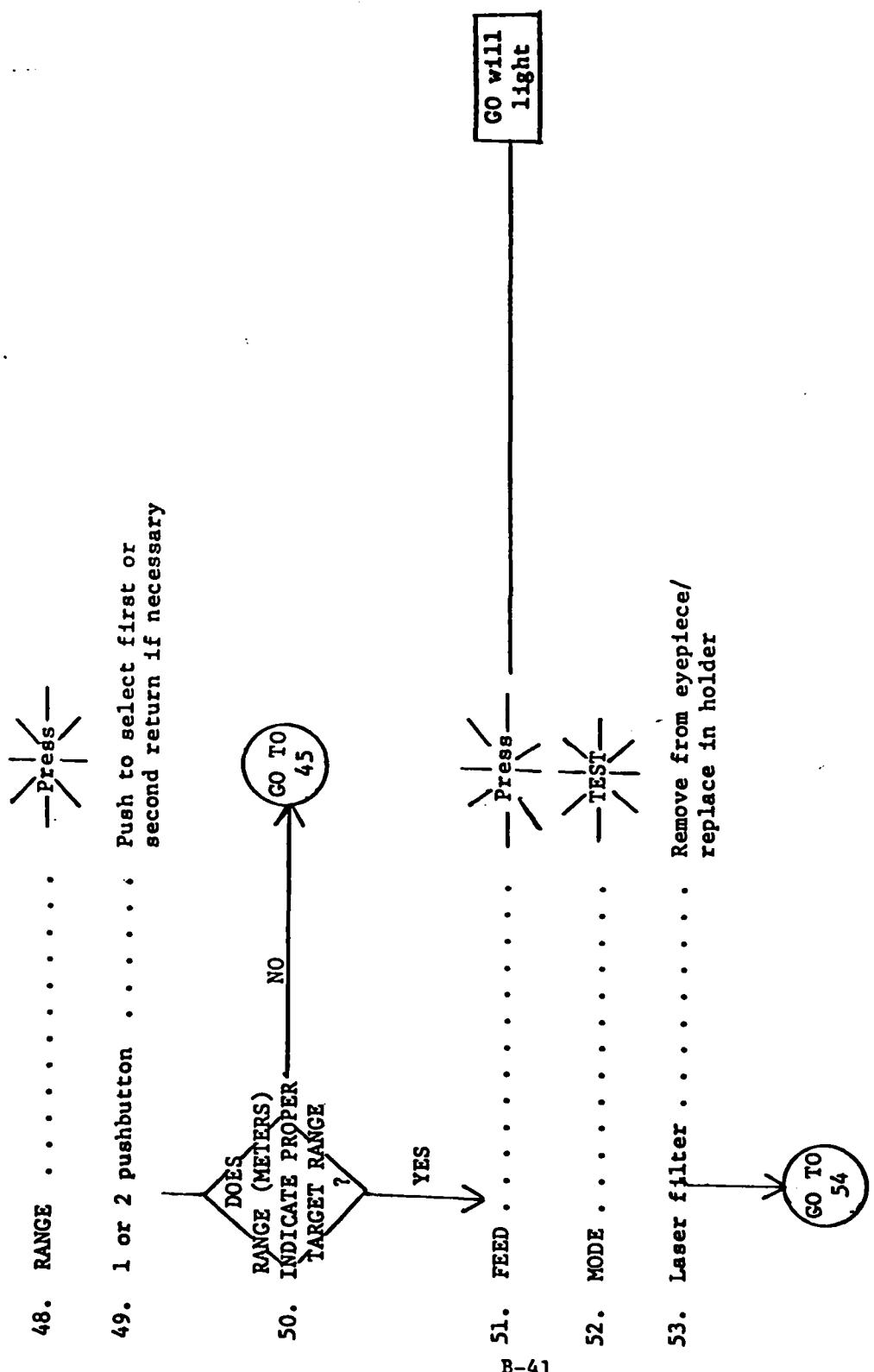
45. LRF eyepiece . . . . . • • • • • Sight target

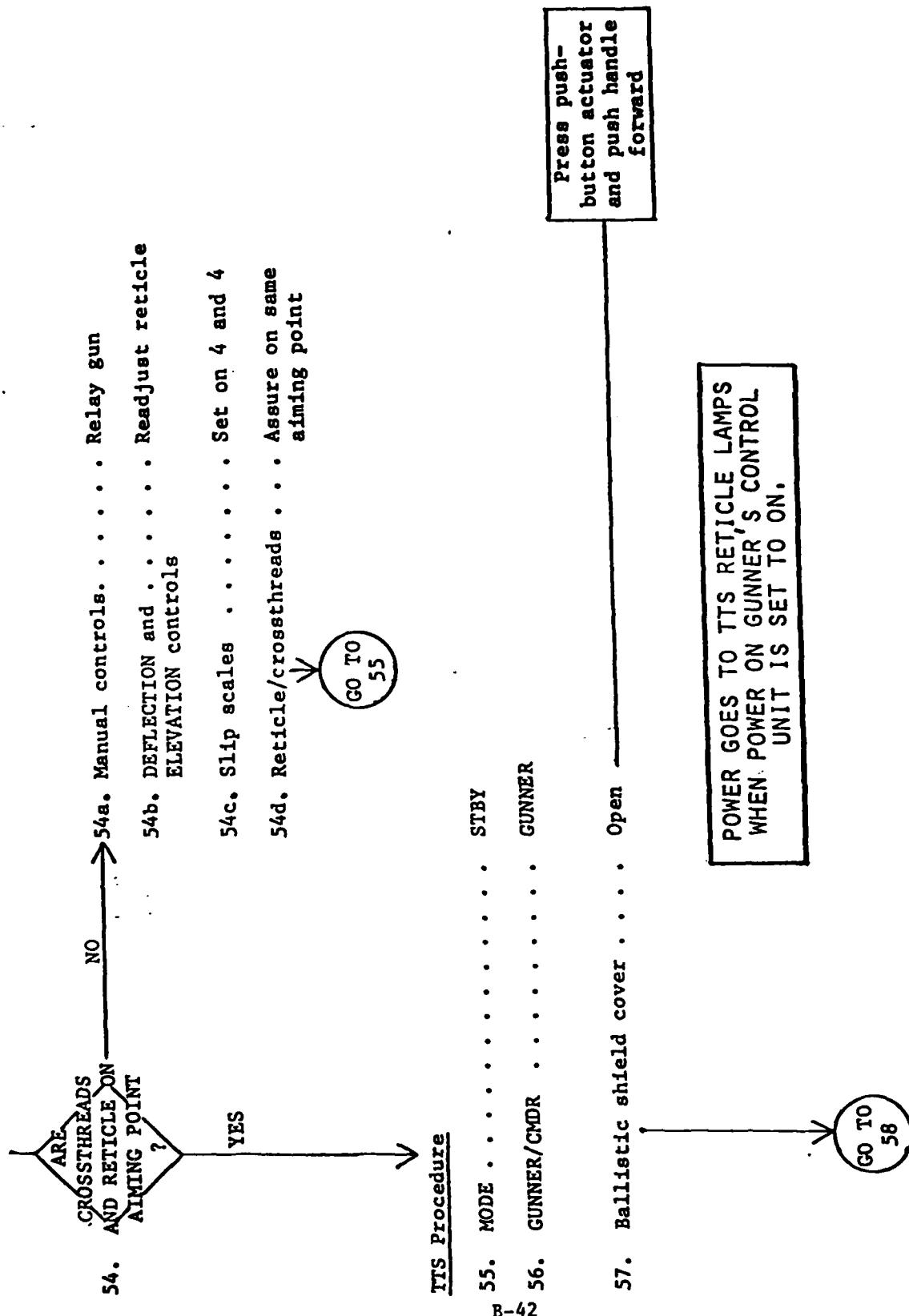
46. DEFLECTION and ELEVATION . . . Lay reticle on target . . . aiming point  
controls

47. Slip scales . . . . . • • • • • Set on 4 and 4

GO TO  
48

Lay reticle from left to right and from low to high without overtravel





58. RTCL control . . . . . Adjust until reticle is just visible
59. Eyepiece . . . . . Sight target
60. Diopter ring . . . . . Adjust for best reticle focus
61. DAY CHANNEL BORESIGHT . . . Lay reticle on target aiming point
62. Slip scales . . . . . Set on EL4 and AZ4
63. ARE CROSSTHREADS AND RETICLE ON AIMING POINT ?
- No → 63a. Manual controls . . . . . Relay gun
- 63b. DAY CHANNEL BORESIGHT . . . Readjust EL/AZ knobs
- 63c. Slip scales . . . . . Set on EL4 and AZ4
- 63d. Reticle/crossthreads . . . . Assure on target aiming point
- Lay reticle from low to high and from left to right without overtravel**

64. COOL indicator . . . . . Assure out
65. THERMAL CHANNEL . . . . . NAR  
FIELD OF VIEW
66. THERMAL CHANNEL RANGE FOCUS. . . Adjust for sharpest view
67. BRIGHT/CONTRAST . . . . . Adjust for normal scene
68. POLARITY . . . . . Set for best image
69. RRCL . . . . . Adjust until reticle  
is just visible
70. Eyepiece . . . . . Sight target
71. THERMAL CHANNEL . . . . . Lay reticle on target  
BORESIGHT EL/AZ knobs aiming point
- B-72. Slip scales . . . . . Set on EL4 and AZ4
73. ARE CROSSTHREADS AND RETICLE ON AIMING POINT?  
No → 73a. Manual controls . . . . . Relay gun
- 73b. THERMAL CHANNEL . . . . . Readjust reticle  
BORESIGHT EL/AZ knobs
- 73c. Slip scales . . . . . Set on EL4 and AZ4
- 73d. Reticle/crossthreads . . . . . Assure on target  
aiming point
- 
- GO TO 74

74. Retractor guide/firing pin retractor . . . . Install  
Should be flush with inner surface of firing pin well
75. Firing pin spring retainer . . . . Install  
Depress plunger and rotate clockwise to lock position

76. Zeroing procedure . . . . . Perform (page 43)

ZEROING 105-MM GUN

(TM PAGE 2-373)

DO NOT DISTURB KNOB ADJUSTMENT OF  
TTS 8X DAYLIGHT CHANNEL, TTS THERMAL  
CHANNEL, OR LASER R-T UNIT, EXCEPT  
DURING BORESIGHTING.

1. 105-mm gun . . . . . Bor. light (page 32)



2. MASTER BATTERY . . . . .

3. Target . . . . . Right angle/1200 meters

4. REMAINING TUBE LIFE . . . . . Rotate to computed value

5. AIR TEMP/ALTITUDE . . . . . Rotate to estimated values

6. APPS AMMO knob . . . . . Set on type of ammo to be used

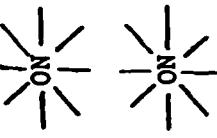
7. HEAT AMMO knob . . . . . Assure in M456 position

8. Engine . . . . . Start/maintain speed (driver)  
at 800-900 rpm

43

Use TM 9-1000-202-14

GO TO  
9



9. POWER on Gunner's control unit

11. MODE on TTS . . . . .

12. GUNNER/CMDR . . . . .

13. RTCL control . . . . .      Adjust until daylight channel reticle is just visible

14. BRIGHT/DIM . . . . .      Adjust for adequate brightness in both channels

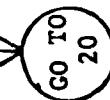
15. LIGHTS . . . . .      Adjust brightness of panel lights

16. MOVING/STATIONARY . . . . .      STATIONARY —

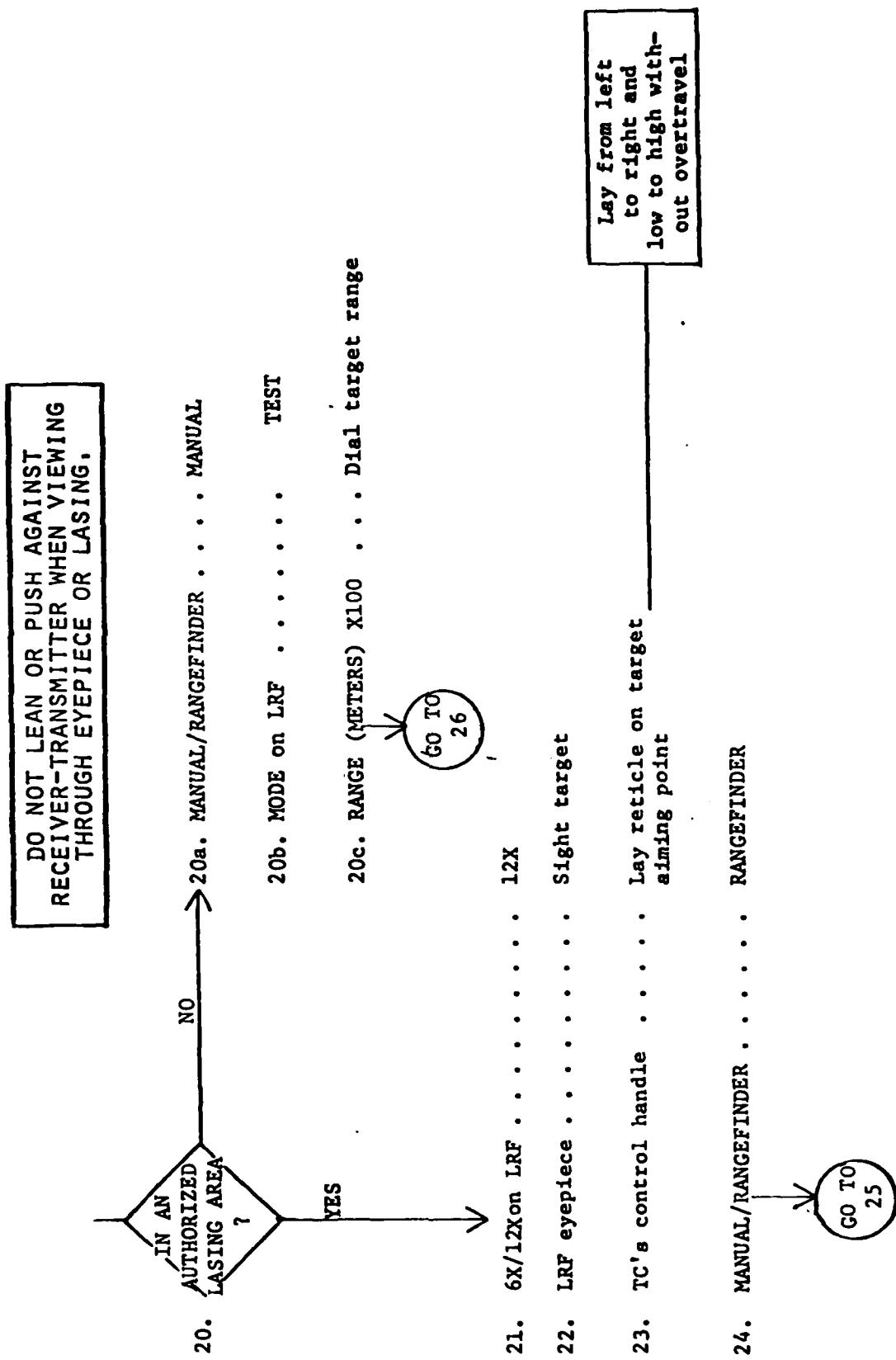
17. AZ/EL COMMON ZERO . . . . .      Rotate from 3 to 0 without overtravel

18. AZ/EL ZEROING . . . . .      Only for types rounds being zeroed, rotate from 3 to 0 without overtravel

19. NORMAL/BORESIGHT . . . . .      NORMAL



Operating Procedure



25. RESET . . . . . ——————  
                   |      |  
                   |      | Press/release ——————  
                   |      |  
                   |      |
26. Laser safety filters . . . . . Attach to eyepieces of TTS/  
                   M105D telescope/LRF
27. MODE on LRF . . . . . ——————  
                   |      |  
                   |      | AUTO ——————  
                   |      |  
                   |      |
- DO NOT VIEW LASER BEAM THROUGH  
   ANY UNFILTERED DEVICE, FIRE LASER  
   IN AUTHORIZED LASING AREA ONLY.
28. RANGE . . . . . ——————  
                   |      |  
                   |      | Press/release ——————  
                   |      |  
                   |      |
29. GO light . . . . . Assure on
- B-49
30. IS INDICATED RANGE CORRECT?  
       NO ——————  
                   |  
                   | GO TO 21  
                   |  
                   | YES ——————  
                   |  
                   | GO TO 31

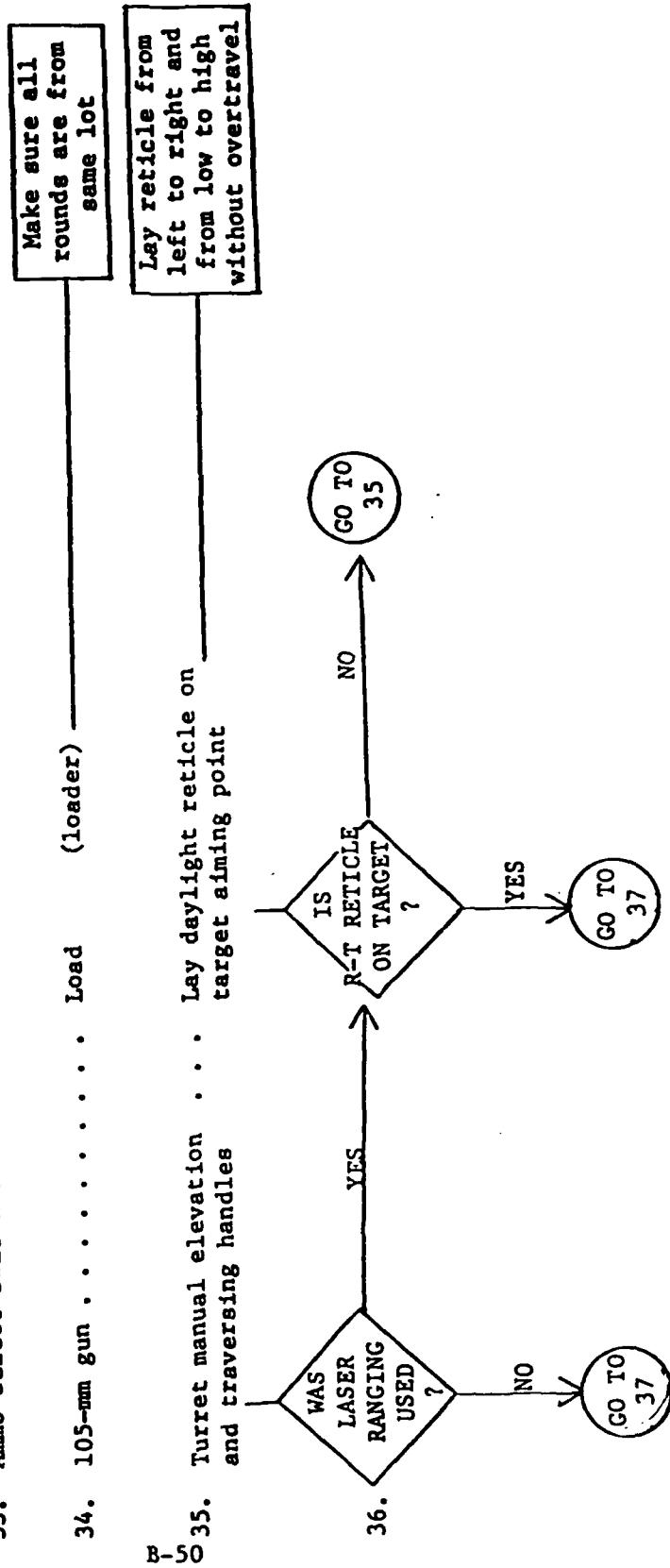
- 
 31. MODE on LRF . . . . .  
 32. Laser filters . . . . . Remove from TTS, telescope,  
and LRF/replace in holders

**IF ELECTRICAL POWER IS INTERRUPTED DURING REST OF PROCEDURE,  
REPEAT STEPS 20-32.**

33. Ammo select switch . . . . . Select appropriate ammunition

34. 105-mm gun . . . . . Load (loader)

- B-35. Turret manual elevation . . . . .  
and traversing handles



37. BLOWER . . . . . ON (TC)



38. MAIN GUN . . . . . ON (TC)

IF RETICLE MOVES MORE THAN 0.1 MIL  
IN TWO SECONDS DUE TO WIND GUSTS,  
DELAY FIRING UNTIL WIND IS STEADY.

Re-lay after  
each shot

39. Trigger on manual . . . . . Fire three-round shot  
elevating handle group

40. Rounds . . . . . Must be within 0.5 mil  
from one another

41. BLOWER . . . . . OFF (TC)

42. ELEV/TRAV POWER . . . . . OFF

43. Hydraulic pressure . . . . . Open for 10 seconds/close  
selector valve

44. Manual elevation . . . . . Recharge  
accumulator

45. CROSSWIND AUTO/MANUAL . . . . . MANUAL

46. CROSSWIND MPH . . . . . 0 mph

GO To  
48

47. Manual elevating . . . . . Re-lay daylight reticle on  
and traversing handles target aiming point

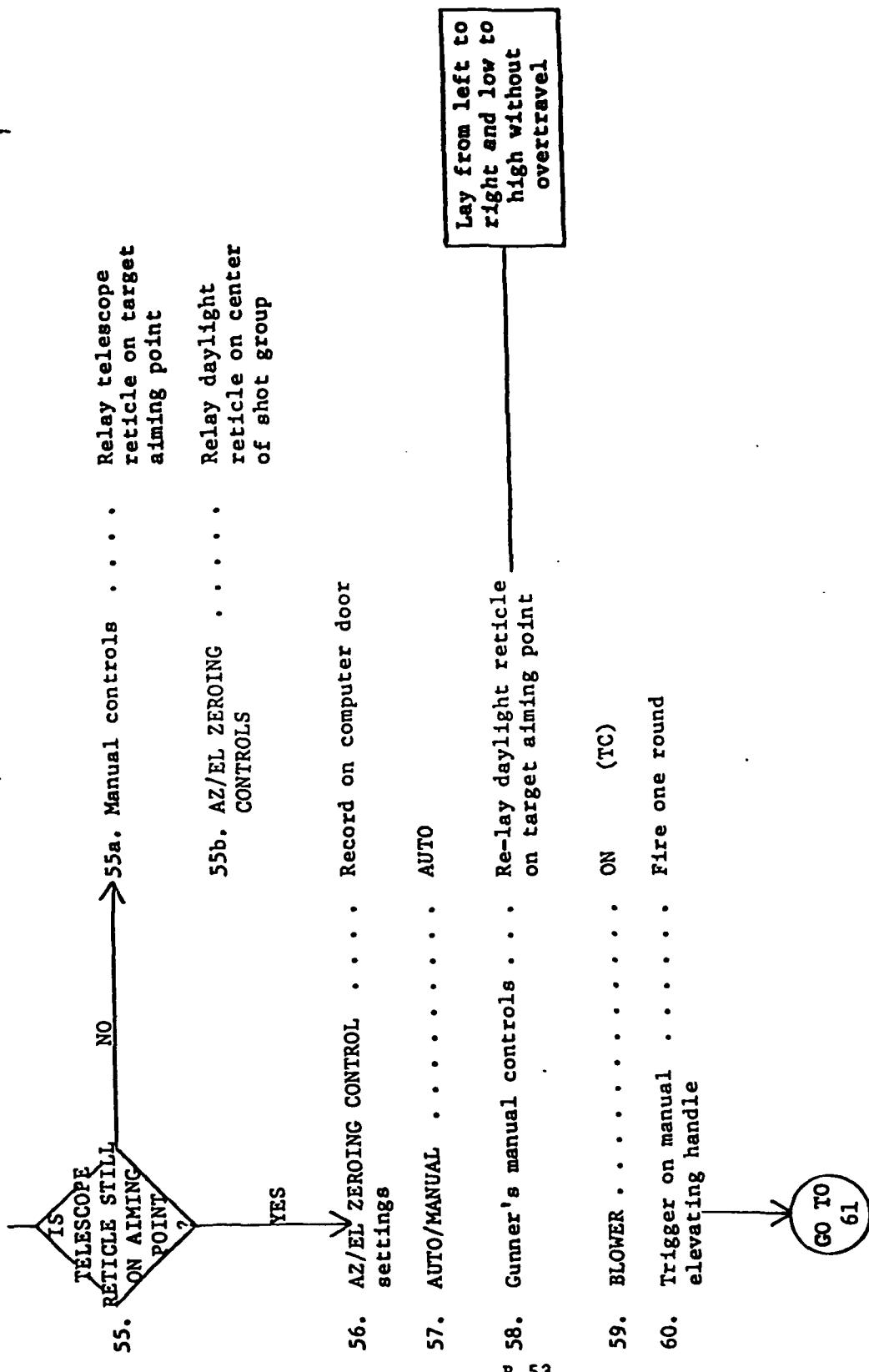
**WHEN ZEROING FSDS AMMO, USE THE  
1200 METER AIMING DOT OF THE  
TELESCOPE APDS-T RETICLE.**

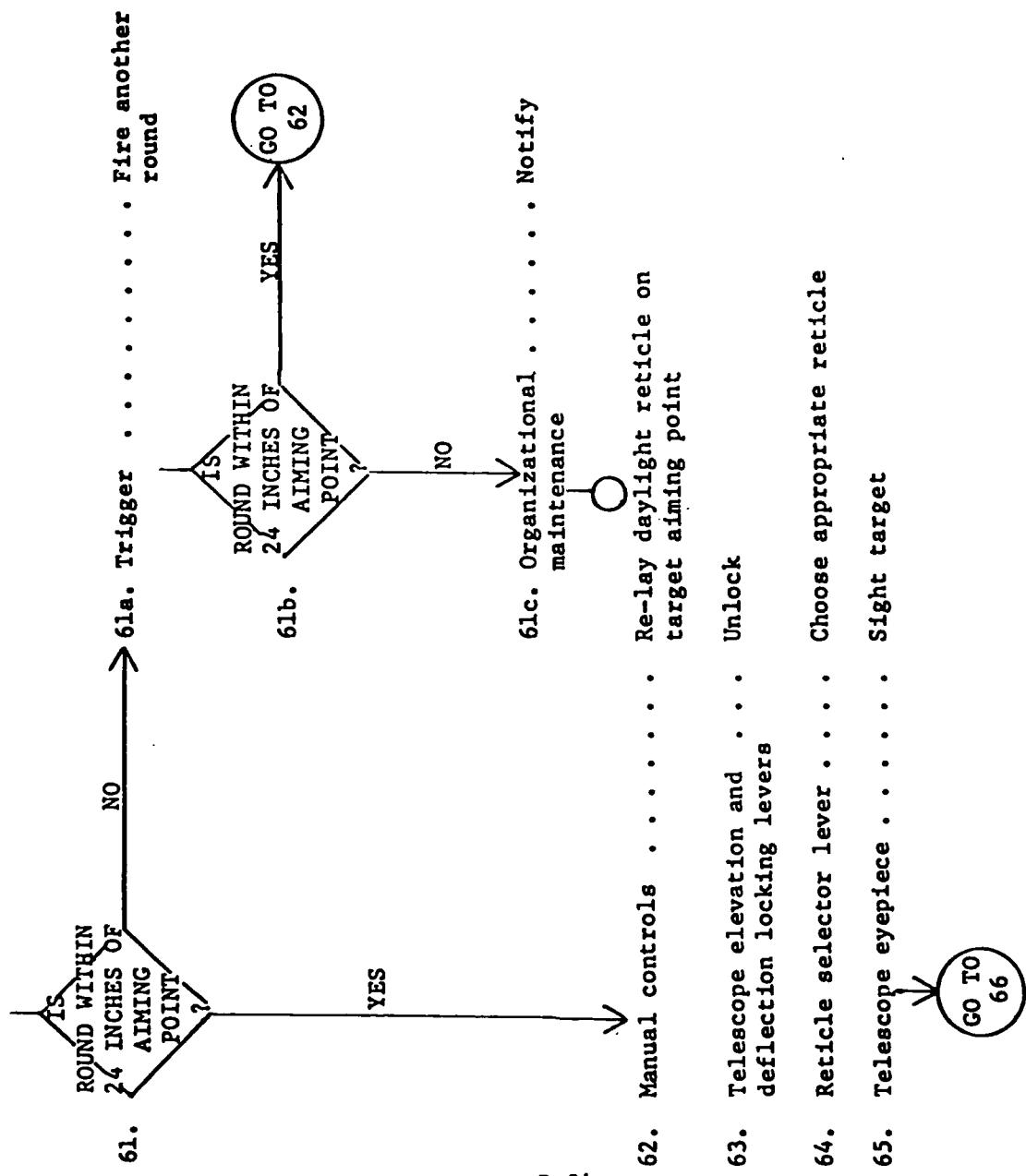
48. Telescope elevation and . . . . . Unlock  
deflection locks
49. Reticle selector lever . . . . . Choose appropriate telescope  
reticle
50. Telescope eyepiece . . . . . Sight target
51. Elevation and deflection . . . . . Lay telescope reticle on \_\_\_\_\_  
boresight knobs
52. Elevation and deflection . . . . . Relock  
locks
53. Boresight scales . . . . . Do not slip
54. AZ/EL ZEROING CONTROLS . . . . . Lay daylight reticle on \_\_\_\_\_  
center of shot group

Lay from left  
to right and  
low to high with-  
out overtravel

Lay from left  
to right and  
low to high without  
overtravel

GO TO  
55



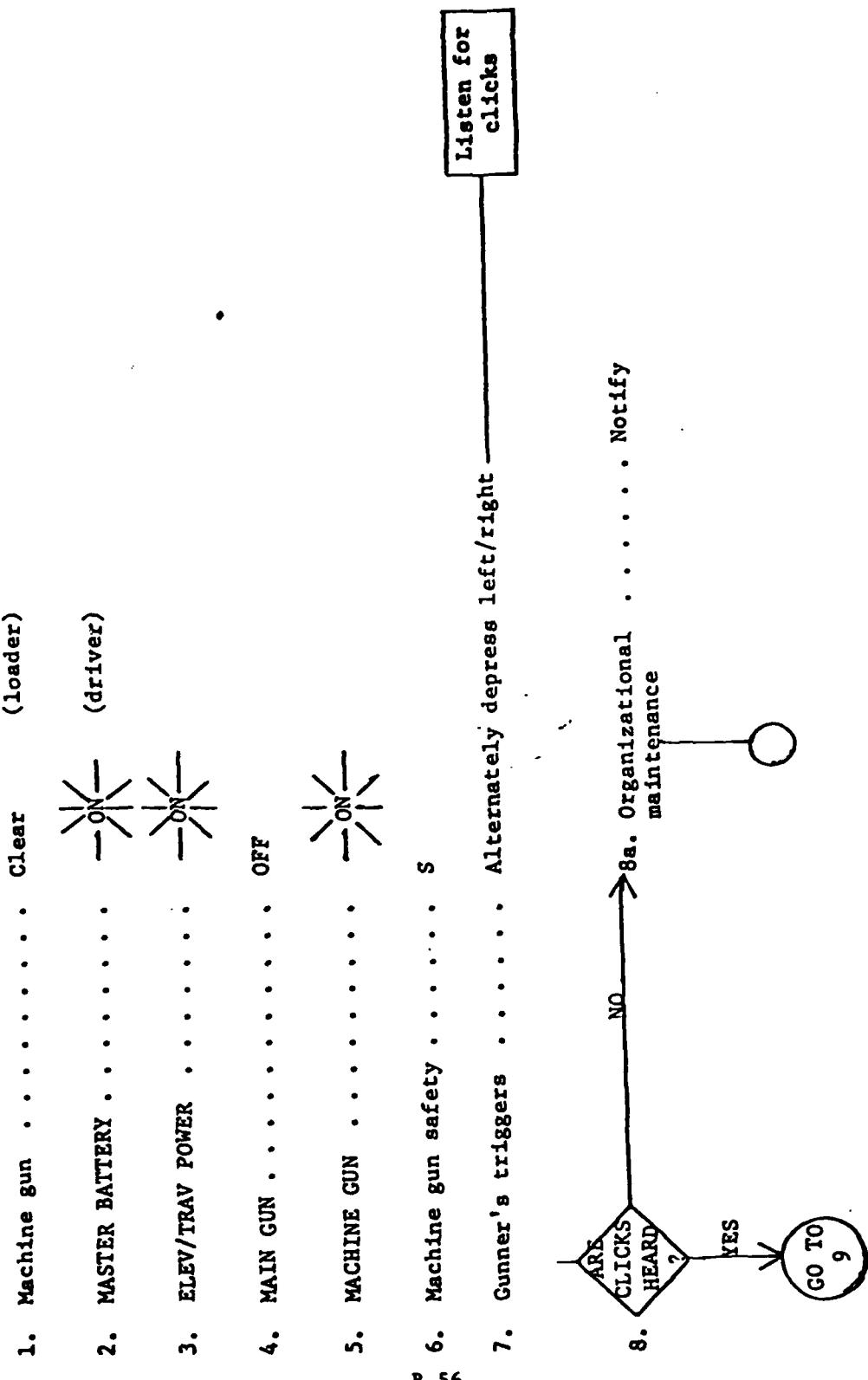


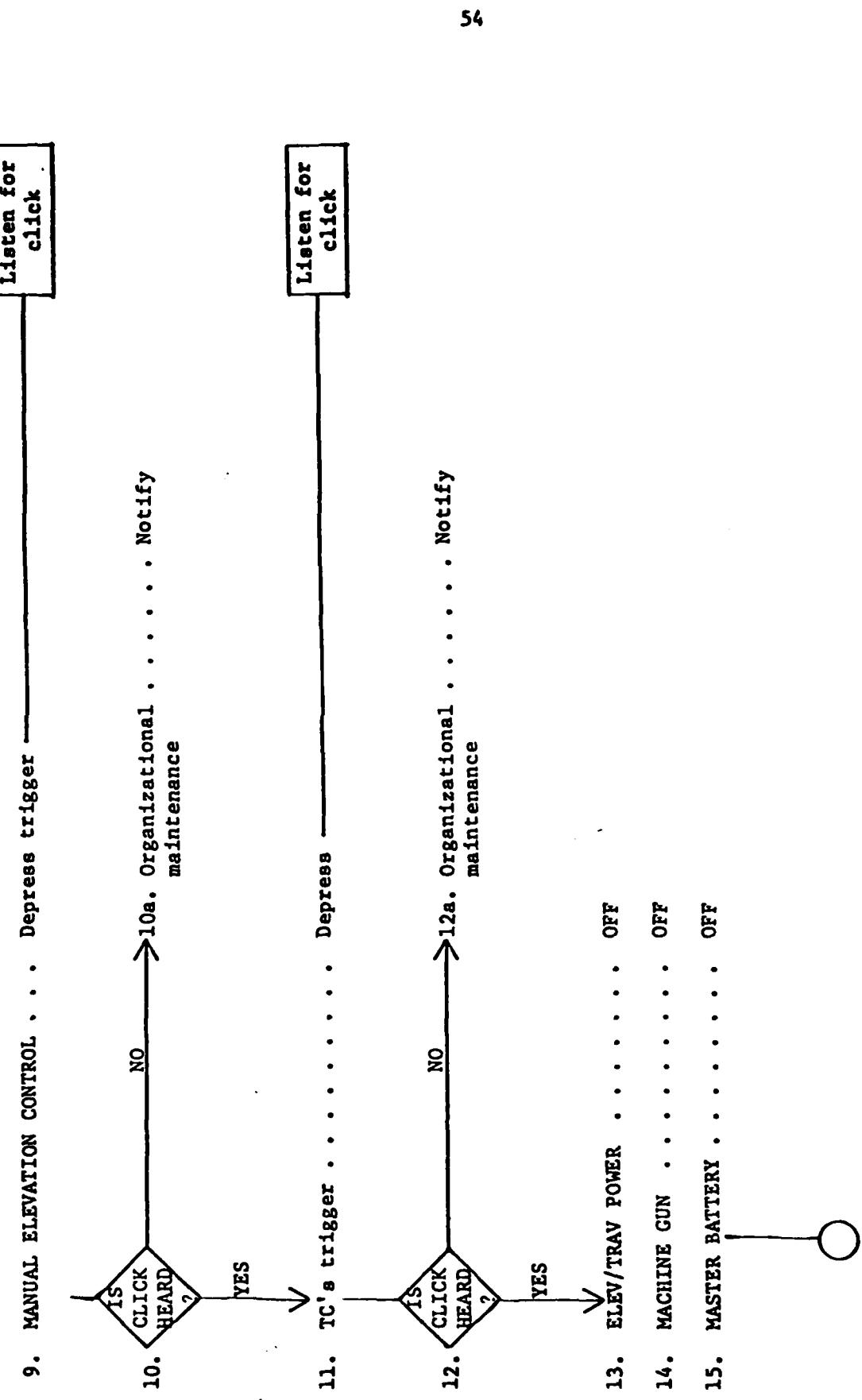
66. ELEVATION and DEFLECTION . . . Lay known target range  
boresight knobs . . . line on target aiming point
67. Elevation and deflection . . . Relock  
locking levers
68. Telescope boresight . . . Record for each type of  
scale readings ammunition
69. Scales . . . . . Do not slip
- 70.
- ```

graph TD
    A{HAS  
EVERY TYPE  
OF AMMO BEEN  
ZEROED?} -- NO --> B[70a. Remaining ammo types . . . Select one]
    A -- YES --> C(( ))
    B --> D((GO TO  
33))
    C --> D
  
```
71. Telescope elevation . . . . . Unlock  
and deflection locking  
levers
72. Boresight knobs . . . . . Rotate to 5, then to 3
73. Elevation and deflection . . . Relock  
locking levers
74. Scales . . . . . Do not slip

TESTING 7.62-MM MACHINE GUN FIRING CIRCUIT

(TM PAGE 3-119)





BORESIGHTING 7.62-MM MACHINE GUN

(TM PAGE 2-360)

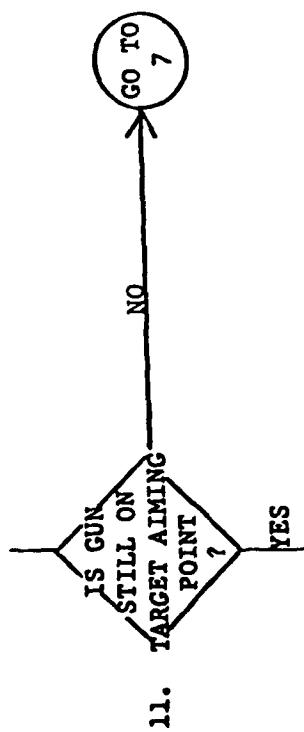
1. Machine gun . . . . . Clear
2. Buffer . . . . . Slide up and off  

Depress release catch
3. Cover/feed tray . . . . . Raise  

Push in on cover latches
4. Charger handle . . . . . Pull back
5. Operating rod and bolt . . . . . Pull out
6. Preliminary boresighting . . . . Perform (Page 32) procedure
7. Front adjustment nut . . . . . Loosen
8. M17AI binocular . . . . . Sight through machine gun barrel bore  

Use adjustment knobs on machine gun mount
9. Center of barrel . . . . . Aline of target aiming point  

Turn additional 1/3 turn after tension is felt
10. Adjustment nut . . . . . Tighten



12. TTS . . . . . Prepare for operation (Page 1)

13. UNITY RETICLE BORESIGHT . . . Aline aiming circle center  
EL and AZ on aiming point

14. 17A1 binocular . . . . . Remove

15. Operating rod and bolt . . . Push in

16. Charger handle . . . . . Pull back

17. Feed tray/cover . . . . . Lower

18. Drive spring . . . . . Push in

19. Buffer . . . . . Slide down

20. Charger handle . . . . . Pull back to check operation

Catch will  
lock

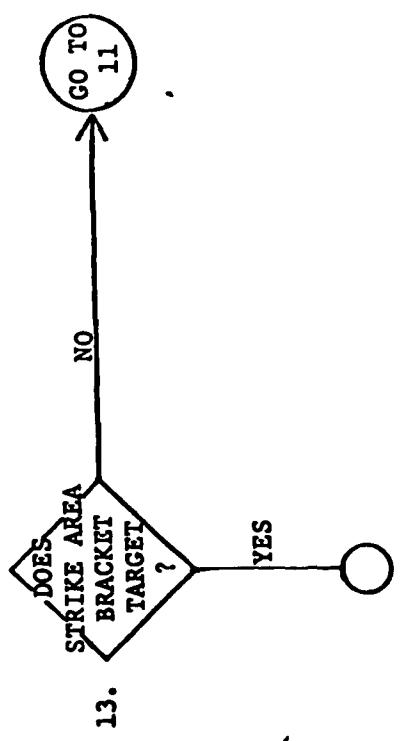
ZEROING 7.62-MM MACHINE GUN

(TM PAGE 2-393)

1. Target . . . . . 800 Meters
2. MODE . . . . . STBY
3. Unity power window . . . . . Sight target
4. RTCL control . . . . . Adjust until reticle is barely visible
5. MANUAL/RANGEFINDER . . . . . MANUAL
6. RANGE METERS X100 . . . . . Rotate to target distance
7. Ammo select unit . . . . . 
8. Unity power window . . . . . Sight target
9. Manual traversing and elevation handles . . . . . Lay target in center of aiming circle
10. Machine gun . . . . . Load/charge
11. UNITY RETICLE EL and AZ . . . . . Move aiming circle to center of strike area
12. Manual traversing and elevation handles . . . . . Relay target in center of aiming circle

Do not disturb  
lay of gun

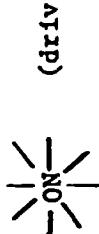
GO TO  
13



PREPARING TO FIRE PROCEDURE  
(TM PAGE 2-400)

COMMAND: PREPARE TO FIRE

1. Interior periscope and . . . . . Clean telescope sights
2. Ballistic shield . . . . . Check operation
3. MASTER BATTERY . . . . . —ON— (driver)



4. Instrument lights . . . . . Check

COMMAND: CHECK FIRING SWITCHES

6. MAIN GUN . . . . . —ON— (driver)
7. Engine . . . . . Start (driver)
8. 105-mm gun safety switch . . . In FIRE (loader)
9. Circuit tester . . . . . Insert (loader)
10. TC's control handles . . . . . Check trigger (TC)
11. Gunner . . . . . Announces: ON THE WAY

B-62

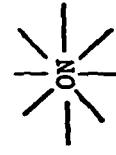
GO TO  
12

12. Gunner's control handle . . . . Check trigger  
 Loader announces  
 NO FIRE if circuit  
 tester does not light

13. Gunner . . . . . Announces: ON THE WAY

14. Manual elevating control . . . . Check trigger  
 Loader announces  
 NO FIRE if circuit  
 tester does not light

15. MAIN GUN . . . . . OFF



16. MACHINE GUN . . . . . ON

17. Coaxial machine gun . . . . . Cock

18. TC's control handle . . . . . Check trigger (TC)  
 Announces: ON THE WAY

19. Gunner . . . . . Announces: ON THE WAY  
 Loader announces  
 NO FIRE if circuit  
 tester does not light

20. Gunner's control handles . . . . Check triggers

COMMAND: CHECK GUN CONTROLS

21. Gunner . . . . . Announces: POWER  
 22. Oil in turret control . . . . . Check  
 system

GO TO  
23

- |     |                                    |                                                                                     |
|-----|------------------------------------|-------------------------------------------------------------------------------------|
| 23. | Turret . . . . .                   | Unlock (loader)                                                                     |
| 24. | ELEV/TRAV POWER . . . . .          |  |
| 25. | Gun/turret . . . . .               | Elevate/traverse using gunner power controls                                        |
| 26. | Magnetic brake/elevation . . . . . | Check shutoff valve                                                                 |
| 27. | Azimuth indicator . . . . .        | Check for accuracy/slippage                                                         |
| 28. | ELEV/TRAV POWER . . . . .          | OFF                                                                                 |
| 29. | Elevation quadrant . . . . .       | Check by use of gunner's quadrant                                                   |

**MAKE SURE THAT CREW IS READY AND NO PERSONNEL OR OBSTRUCTIONS ARE IN SURROUNDING AREA.**

**COMMAND: - CHECK GUN STABILIZATION**

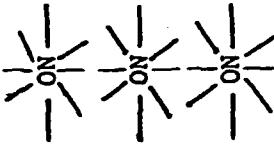
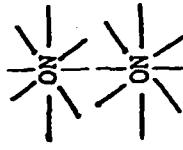
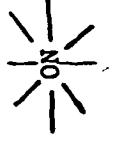
30. STAB ELECTRONICS . . . . .

31. POWER PACK BLOWER MOTOR . . .

(TC) (TC)



**GO TO 32**

32. ELEV/TRAV POWER . . . . .      
33. POWER on selector assembly . . . . .        
Wait 15 seconds  
System is operational  
when green STAB  
indicator lights
34. STAB . . . . .      
35. Gunner . . . . .      Announces: TURRET STABILIZED
36. TRAV and/or EL BALANCE . . . . .      Rotate to null drift
37. Gunner's control handles . . . . .      Check function
38. TC's control handles . . . . .      Activate override/check  
function (TC)
39. STAB SHUT-OFF . . . . .      Depress (TC)
40. POWER on selector assembly . . . . .      OFF
41. Gunner . . . . .      Announces: STABILIZATION OFF  
COMMAND: CHECK FIRE CONTROL
- B-65
42. CUPOLA POWER . . . . .        
(TC)
43. GUN SAFETY . . . . .      ON (TC)  
GO TO 44

44. Cal .50 machine gun • • • • Check operation (TC)
45. XM21 computer • • • • Perform self-test (Page 9)
46. 105-mm gun • • • • Prepare for boresighting (loader)
47. LRF • • • • • Perform self-test (TC)
48. Gunner's telescope and • • • Boresight (Page 24 or 32) periscope
49. LRF • • • • • • • • Boresight (TC)
50. Ammo switch • • • • Select appropriate ammo
51. MOVING/STATIONARY • • • • Select appropriate setting
52. Computer • • • • • Enter ballistic data
- B-66  
53. Cal .50 machine gun • • • • Boresight (TC)
54. 7.62-mm machine gun • • • Load (loader)
55. 105-mm gun • • • • Load (loader)
56. Cal .50 machine gun • • • • Load (TC)
- COMMAND: REPORT
57. Gunner/Driver/Loader • • • Announce: READY

**BEFORE OPERATIONS PMCS**

(TM PAGE 2-87)

1. Travel lock . . . . .      Unlock/stow (loader)
2. Turret lock . . . . .      Check operation/leave (loader)  
in unlocked position

**MAKE SURE CREW IS IN SAFE  
POSITION BEFORE OPERATING MANUAL  
TRaversing AND ELEVATING HANDLES**

3. Manual elevating handle . . . . .      Elevate/depress main gun
  4. Manual traversing handle . . . . .      Traverse turret left/right
- Check for smooth movement
- Check for smooth movement
- 

DURING OPERATIONS PMCS  
 (TM PAGE 2-105)

1. Gunner's seat . . . . . Check if missing
  2. Gunner's seat . . . . . Check operation/adjustment
  3. Radio/intercom . . . . . Check operation
  4. Fire control elevation . . . . . Check if scale and index quadrant are readable
  5. Level vial cover . . . . . Check for free movement
  6. Level vial . . . . . Check if broken
  7. Light source control . . . . . Check if light goes from bright to dim
- 
- ```

graph TD
    1[1. Gunner's seat] --> 2[2. Gunner's seat]
    2 --> 3[3. Radio/intercom]
    3 --> 4[4. Fire control elevation]
    4 --> 5[5. Level vial cover]
    5 --> 6[6. Level vial]
    6 --> 7[7. Light source control]
    7 --> 8{8. IS FIRE CONTROL QUADRANT TO BE USED?}
    8 -- NO --> 8a[8a. Level vial cover]
    8a --> 9[9. Azimuth indicator]
    9 --> 10[10. Rheostat]
    10 --> Box[Light should go from dim to bright]
    8 -- YES --> 9
  
```

11. Turret hydraulic system . . . Check for leaks
  12. Hydraulic pressure gage . . . Should read between 900 and 1200 psi during hydraulic operations
  13. Gunner control handles . . . Traverse turret counter-clockwise
  14. TC control handles . . . . . Override gunner and traverse turret clockwise (TC)
  15. TRS ballistic shield . . . . . Assure open
  16. TRS window/outside lens . . . . . Check/clean - of M105D
- Depress palm switches**
- Use cleaning compound and lens tissue**

860930 (7)